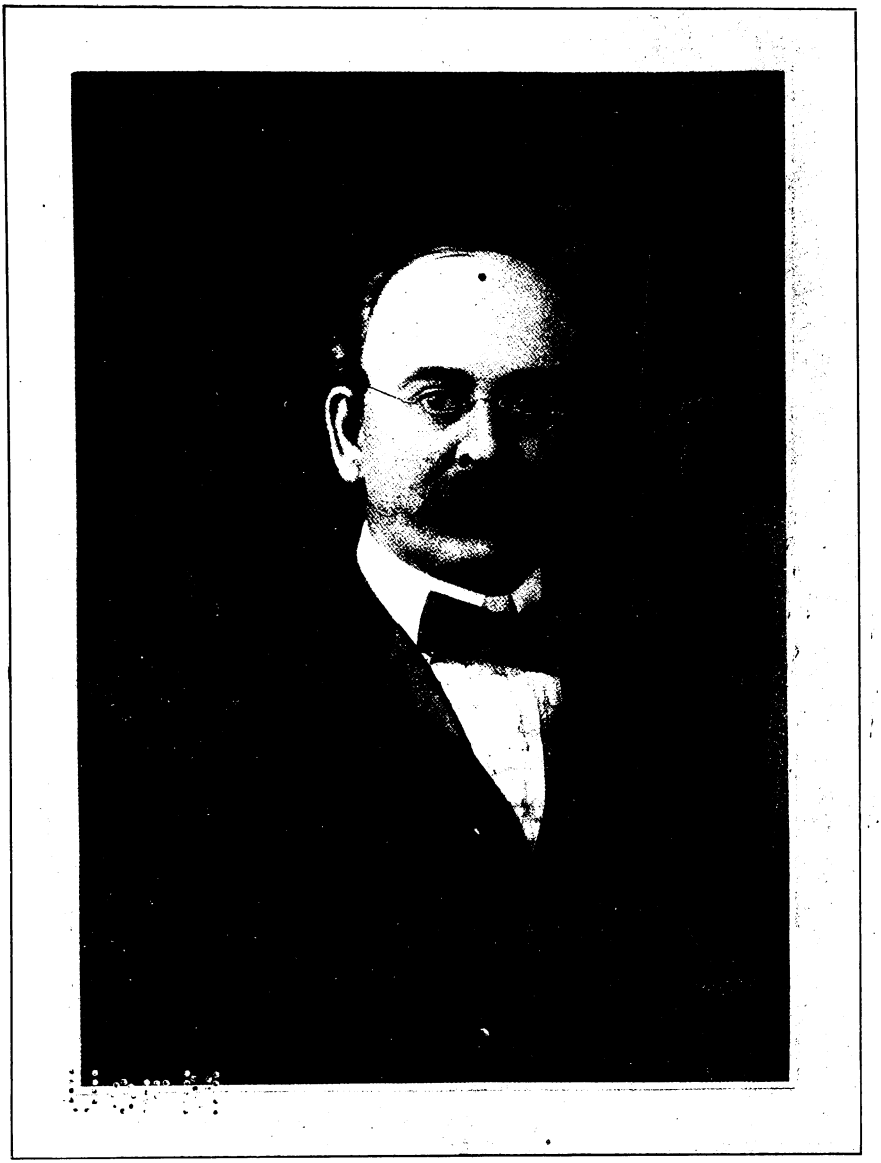


RODERICK M. SANGER, D.D.S.



The Gold Inlay*

By Dr. J. V. Conzett.

Gold is pre-eminently the material with which to fill cavities in the proximo-occlusal surfaces of the bicuspid teeth. It may, occasionally, be permissible to fill cavities in the molars with amalgam, but when this is done to any teeth in front of the molars, it is to the disfigurement of the patient by the darkening of the tooth, due to the discoloration of the filling material used. Amalgam is too frequently used in these positions, however, to the discredit of the profession, and it is the almost daily task of many operators, with a better idea of the æsthetics, to remove such eyesores and attempt to get rid of the resultant discoloration and refill with gold. Cavities in such positions should never be filled with anything but gold. Amalgam, as has been said, is discredited because of the unsightly appearance of the tooth after the filling has been in place for a sufficiently long time for the filling to darken. The cements are not strong enough to bear the brunt of mastication without breaking, and what is worse, the wear of the cement will allow the teeth to gradually fall together; thus destroying the interproximal space. As for the silicious cements, they have not proven to be very much more dependable than the oxy-phosphates. Occasionally a porcelain inlay may be used in the mesio-occlusal surface of an upper first bicuspid, when the occlusion is such that no stress comes upon it, but the occasions are so rare that this material for such positions is a negligible quantity. So we are driven back to our first statement that gold is pre-eminently the material to use in these locations.

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Cavity Preparation.

The preparation of a cavity in the proximo-occlusal surface of a bicuspid does not differ materially from that employed in the same surface of a molar, except that the anatomical differences in the formation of the tooth will cause a difference in the shaping of the cavity, but the same general principles will apply to both cases.

When a cavity is discovered in the proximal surface of a bicuspid, it is just gingival to the contact point, and entrance to the cavity will have to be obtained from the occlusal surface. With a cross-cut fissure bur entrance is made to the fissure in the crown of the tooth, and the fissure followed toward the surface in which the cavity is located, when, as the proximity of the cavity is approached, the bur will drop into the cavity, and then the marginal ridge should be carefully cut through. Care should always be observed when nearing the supposed site of the cavity that the entrance to the cavity proper is not made too suddenly, for the cavity may be much deeper than is thought, and the pulp may be penetrated, to the intense suffering of the patient. After the marginal ridge is broken through, the chisel is brought into requisition and the overhanging walls of enamel chiseled away. The decay should be carefully removed with a spoon excavator and the extent of the involvement definitely ascertained. If it is decided that there is no pulp complications, and that it is advisable to proceed with the filling, the proper outline form should be obtained. This will include the extending of the cavity in all of its margins into the area of relative immunity to decay, which is the area that is kept habitually clean by the excursions of food in mastication, the movements of the cheek, lips, and tongue, and the use of toilet helps. This means, let us repeat, that all of the margins of the filling will be free from contact with the proximating tooth, or with any filling material that may have been placed in such tooth. The gingival margin will be carried gingivally far enough to have its margin under the free margin of the gum. When these principles have been carried out we may feel secure in our position, as far as the invulnerability of our margins to a recurrence to decay is concerned, if we properly adapt the filling material to such margins.

The seats, both occlusal and gingival, are flattened with an inverted cone bur. It is best to use one that is as large as the situation will permit, care being taken that too large a one be not used, for fear that the sharp ends of the inverted cone might penetrate the pulp chamber, which has been done by the inexperienced.

The occlusal step has been mentioned, and advisedly so, for the cavity should always be made with an occlusal step. I have recently been reading a work on the preparation of cavities for inlays, and the method of preparation that had for its principle the entering of the cavity from

the occlusal surface at the marginal ridge, and cutting only so far as necessary to remove the decay, and dependance upon axial grooves for retention was advocated. Such a cavity was illustrated in the preparations of the cavities in the molars in a previous paper, and the fallacy of such preparations pointed out. I only wish to say that all that was said against such preparation in the molar applies with even greater force in the preparation of cavities in the bicuspids. Such cavities should always be made with an occlusal step, except with the case of a cavity occurring in the proximal surface of a bicuspid that had no approximating tooth in position. In such case the cavity could be easily reached from the proximal surface, and if the decay was not so extensive that the marginal ridge was endangered, it would be good practice to fill or inlay that tooth from the proximal surface, and not involve the occlusal surface unless it had become carious, when it would, of course, need to be repaired.

The retentive form is largely obtained from the step in the occlusal surface, and this step should be as deep and as broad as the necessities of the case will demand. A study of the conditions involved will disclose the amount of stress that the finished inlay will have to resist, and the step in the occlusal surface will have to be made in accordance with the facts deduced from such an examination. A constant repetition of the injunction "study conditions" is never amiss. This principle was so constantly urged upon the members of the Wedelstaedt Club by Dr. Wedelstaedt, that at one of the club meetings a number of stickers was provided for the members, and they were told to stick them on their cabinets, brackets, and all places where they would be constantly reminded of the principle. I do not know of anything that has done more good for the members of the club than that, for it impressed them with the necessity for the study of conditions in such a manner that they have never forgotten it. I wish that I might in some such manner impress the readers of these articles with the same idea, with the result that they would never again fill a tooth nor perform any other dental operation in a routine manner, but would in all cases first "study the conditions involved," and then operate accordingly. If we were able to obtain any appreciable number of men who would conscientiously follow such a course, this series of articles would have more than paid for the time and labor involved.

Treatment of Margins.

The gingival seat has no great retentive nor resistance function, but is the foundation base of the filling, and should be perfectly flat to prevent any tendency to movement in any direction. The axial walls should be as nearly parallel as it is possible to make them. They

are made with an inlay bur; one that is dentate is a favorite with the writer, to be followed if preferred with one of the same kind without the cross-cut. After the cavity is practically prepared with the burs, it is smoothed up with sharp chisels and hoes. The cavity is now finished with the exception of the preparation of the cavo-surface margin. This is to be beveled all around as are all of the cavities for the reception of the gold inlay. It cannot be too strongly emphasized that the bevel that will protect the enamel rods is the only preparation that is rational in the treatment of a tooth for the reception of filling or inlay. It is true that

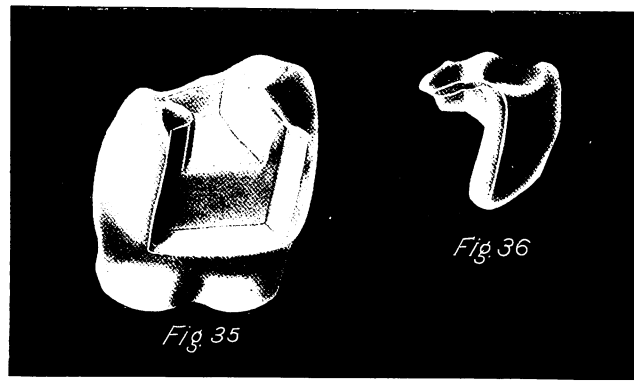


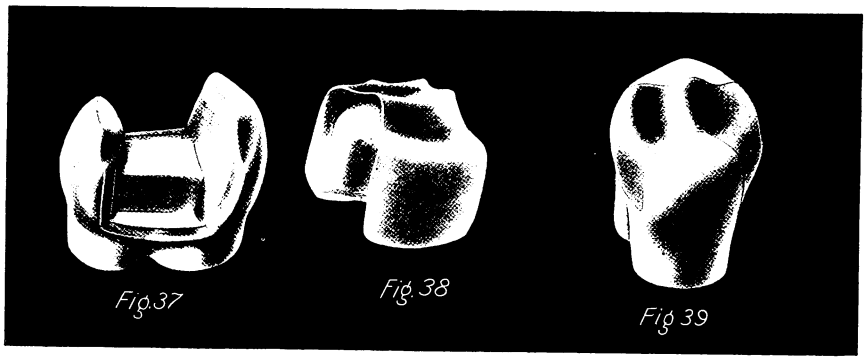
Fig. 35

Fig. 36

enamel is stronger than any filling material that we possess, used as we do use them for the protection of the tooth, but it is only strong as its continuity is unbroken. The moment that the continuity of the enamel is broken, that moment it becomes very weak, and such a break can be followed up and the entire enamel of the tooth easily stripped from the tooth by splitting away the rods that are next to the break. So weak are they when they stand alone, that it is very dangerous to attempt to allow them to protect the tooth without assistance, and this assistance is best given by the bevel. The bevel should not be too long, so that it would occasion a long feather edge to the overlapping gold, for by so doing the gold bevel is made so weak that the object is destroyed, and you will have a curling up of the gold, a flowing away from the margin and, in time, a consequent recurrence of decay through the ability of the organisms of decay to lodge upon the roughened surface occasioned by the curling and breaking away of the feathered edge. The correct margin is best obtained with the marginal trimmers that have been advised in the previous papers. Disks and stones are at best uncertain in the results that they obtain, and this is particularly true when it applies to the gingival surface.

It may be possible to obtain a fairly good margin upon the occlusal surface with a stone, and I can conceive of some positions in which the disk might be of advantage in helping to shape a margin, but the rule that all cavo-surface angles should be made with hand instruments is a good one, and should be followed as much as it is possible to do so.

In Fig. 35 we find a cavity in the mesio-occlusal surface of an upper bicuspid that will illustrate the principles which we have been trying to enunciate, and in Fig. 36 is illustrated the inlay that is to fill the cavity.



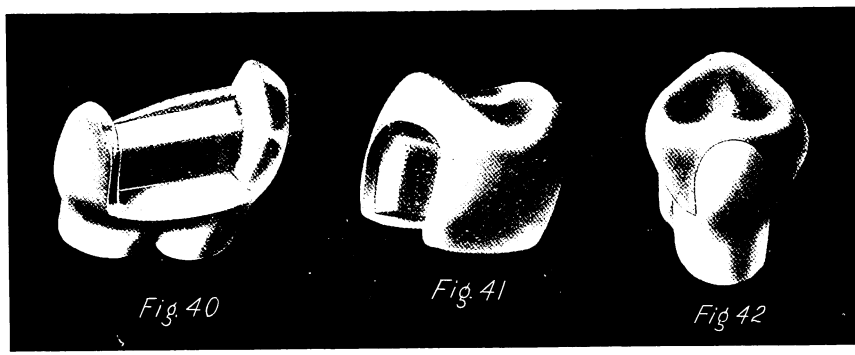
Distal Cavities.

There is very little difference in the treatment of cavities in the distal surfaces of bicuspids from that employed in the filling of cavities in the mesial surfaces thereof; indeed it is so slight that the one illustration will do for both. The difference lies in the variation of stress upon the two surfaces, and the intelligent meeting of the differing conditions, which has been repeatedly pointed out in previous papers, so that a repetition would be superfluous.

M. O. D. Cavities in Bicuspids.

Cavities occurring in both the mesial and the distal surfaces of bicuspids at the same time may be treated in two ways. Either make each inlay separately and dove-tail them into each other, in the manner that was indicated in the treatment of M. O. D. cavities in molars, or in the making of an M. O. D. inlay for the case. This in bicuspid cavities is not attended with the danger of distortion due to the mass of gold in the inlay, as it is in the case of molar cavities, because of the difference of the size of the tooth under consideration. And yet it requires a very careful technique to perfectly cast an M. O. D. inlay that will perfectly fit the cavity even in a bicuspid tooth. There is no difference in the principles involved in the preparation of an

M. O. D. cavity, except that care must be exercised not to allow the axial walls to converge at the gingival, for if that is done it will be impossible to remove the inlay pattern without distortion, and will make impossible the insertion of the finished inlay. In order to avoid the possibility of such an occurrence, it is best to incline the axial walls from the gingival to the occlusal surface, allowing the planes to approach each other at the occlusal step, as indicated in Fig. 37. This manner of preparation would not be advisable if the inlay were to be a simple M. O. or D. O. cavity, for the inclined plane would not give the frictional resistance that a plane



perpendicular to the step would give; but in an M. O. D. cavity we have the advantage of the resistance offered by both sides of the tooth at the same time; consequently the retention is amply sufficient for all such cases, even when the axial walls are inclined toward each other.

The shape of the bicuspid teeth makes them very susceptible to fracture, if any great amount of tissue has been lost and the cusps have not been properly supported with the filling material. If the pulp has not been removed, it is not often necessary to carry the gold over the cusps, but if the cavity is at all large, it is best to protect the cusps from too great stress by broadening the cavity at the occlusal step, and thus carrying the gold over the buccal and lingual ridges toward the cusp of the tooth in such a way that the stress of occlusion comes upon the gold and not upon the tooth. This manner of the protection of the cusps will be seen in the illustration (Fig. 37). In the finished inlay it will be seen that although the gold is carried toward the cusps it is not carried over them, and is therefore not seen. (Figs. 38 and 39.)

If the pulp has been removed, the dentine of the tooth has of necessity been so largely lost that the tooth is very weak and will need careful protection if the danger of future fracture of the tooth is to be avoided. This is done by cutting off the cusps and carrying the gold over them,

making the whole occlusal surface of the tooth of gold. This is accomplished with a carborundum stone and enough of the tooth removed to bring the walls of the tooth into sound, strong tissue. The walls are now beveled with a good long bevel, so that the finished inlay will have a flange cast upon it that will lock the buccal and lingual walls of the tooth together and perfectly protect them from fracture. It is possible in this way to save a tooth with an inlay that would have been crowned before the advent of the inlay. For no matter if the decay has extended so far that the entire distal and mesial portions of the tooth have been lost, and the buccal and lingual walls so reduced in strength that they are in imminent danger of fracture before anything has been done for their restoration, if the pulp has been removed the tooth may be strengthened with cement and a cavity prepared as in the illustration (Figs. 40, 41, 42), and the tooth saved without recourse to the crown.

Sometimes there is so great a body of gold in these cases, or would be if means to prevent it were not taken, that it is advisable to hollow the inlay pattern and remove a large quantity of the wax from the interior of it. This will save a large amount of gold, and will have a tendency to make a better fitting inlay.

It will be observed that the writer frequently cautions against the use of larger masses of gold in a casting than is absolutely necessary, and the reason for so doing is that gold expands when heated and contracts when it cools, and the best scientific knowledge at our disposal verifies the known behavior of gold under other conditions, in casting under the Taggart method. This contraction is so slight with the technique, as it has been developed by Dr. Taggart, that it is almost negligible, in inlays of ordinary size, but when we come to large masses of gold it is the experience of the writer, and of many other observers and experimentors that the degree of distortion is by no means to be neglected if we are to obtain perfect results. It is true that the cements that are now given us by the manufacturers are of so good a quality that they will preserve a tooth for a long time, even though there is a slight discrepancy between inlay and filling, but it is not a safe proposition to stake one's reputation upon, therefore I prefer to take the safe side and form the inlay with gold in as small a mass as possible consistent with the best results. This only applies to very large masses, as I have said, for in the ordinary inlay the contraction is negligible. For very large restorations the writer's clinical and experimental experience is that the best results are obtained when the mass of gold is reduced to the smallest possible amount by the hollowing out of the interior of the inlay.

Dental Radiography.*

By Howard R. Raper, D.D.S.,
Professor of Operative Technic and Roentgenology at Indiana Dental College, Indianapolis.

The X-Rays.

When the current passes from anode to cathode, the cathode stream (Fig. 46) is given off from the cathode. The cathode stream is a form of vibratory motion of the ether. Leaving the conclave surface of the cathode, the rays are given off from this point. (Fig. 46.) The cathode stream can be seen in a tube of very low vacuum, appearing blue.

The cathode stream should strike the target at a point. Great heat is generated at this point. Hence the necessity of making the target of some very high fusing metal. A small hole may be burned superficially into the target without spoiling the tube. The tube in figure 47 has a long sheath of metal connected with the target to take up the heat. Tubes are made with a means for cooling with water. These are intended for treatments rather than picture work, though they may be used for the latter.

X-rays were discovered by William Conrad Roentgen, professor of physics, at the Royal University of Wurzburg, Germany, in the summer of 1895. Roentgen applied the name X-rays because he did not know just what he had discovered, X, the algebraic symbol for the unknown being adopted to signify this ignorance. They were not called X-rays because the rays cross, forming an X, as is popularly supposed.

The Roentgen Congress, in Berlin, 1905, adopted a uniform set of technical terms in which the word Roentgen always occurred. Thus we have the phrase Roentgen ray for X-ray and such words as Roentgenology, Roentgenologists, Roentgenogram, etc., etc. While approving of a move for a uniform nomenclature, many of the new words are long and unwieldy and the writer shall, in this work, use many of the old and better-known terms.

X-rays are invisible, vibratory waves of or in the ether. The most popular theory is that they are light waves with an inconceivably rapid rate of vibration. Red light rays vibrate at the rate of four hundred billion per second; violet rays vibrate at the rate of seven hundred and fifty billion per second. The intermediate colors—blue, green, yellow and orange—vibrate at intermediate degrees of rapidity.

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Though human vision is limited to about three hundred and fifty billion variance, the difference between four hundred billion and seven hundred and fifty billion, may we not fairly assume that there are light rays of a higher and lower vibration invisible to us? Ultra-violet rays have a more rapid vibration than violet rays, and have no action on the

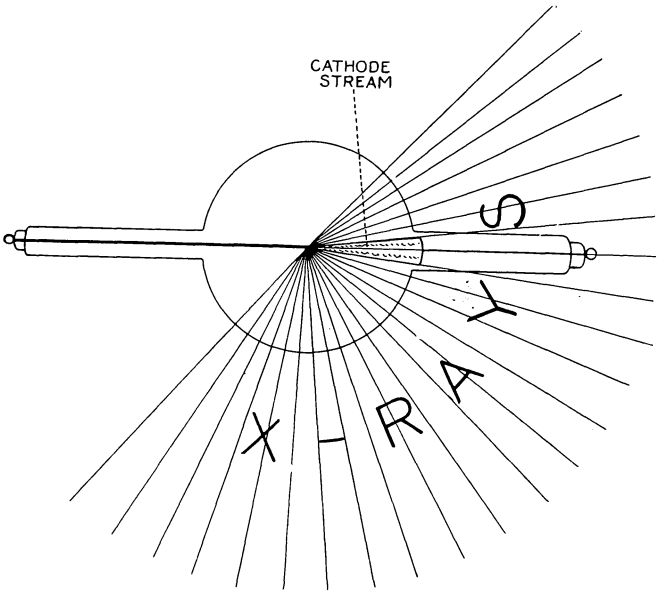


Fig. 46. Showing the direct X-ray and the cathode screen.

retina, and are therefore invisible. X-rays vibrate more rapidly than ultra-violet rays. The rapidity of their vibration is estimated at 288,224,000,000,000,000* (two hundred and eighty-eight quadrillions, two hundred and twenty-four trillions—French notation) per second.

When light strikes an object and can be seen as light, it is because the light is reflected from the object to the eye. X-rays are invisible because they cannot be reflected. When they strike an object they are either absorbed, or pass through it. X-rays are not discernible to any of the special senses. They pass from the focal point on the target in

*Custer's "Dental Electricity."

regular, diverging lines. (Fig. 46.) They cannot be reflected, refracted, or condensed, and penetrate objects directly according to the density of the object.

The passing of the X-rays through the glass of the tube gives rise to a green fluorescence (green light) in the active hemisphere—the hemis-

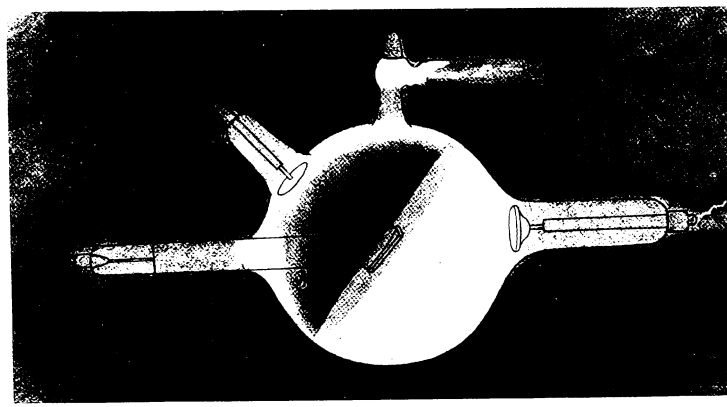


Fig. 47. X-ray tube properly lit up.

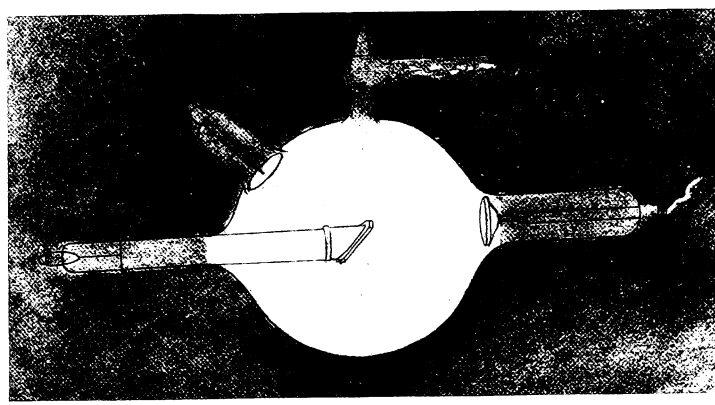


Fig. 48. X-ray tube with the current passing through it in the wrong direction.

phere in front of the target—of the tube. Whether a tube is working well or not can be determined by this fluorescence. There should be a definite line of demarcation between the active and inactive hemispheres of the tube. A tube working properly should light up as per figure 47. The light is never quite steady; it wavers a little. High, medium and

low tubes give slightly different fluorescences when in operation. The fluorescence from a high tube is a very light yellowish green; from a low tube a bluish green and from a medium tube an intermediate shade of green.

Just here let it be said that an exact colored picture of an X-ray tube in operation has never been made. I obtained the services of an artist and spent a great many hours on the work, but was unable to make a picture worthy of reproduction. The light from an X-ray tube in

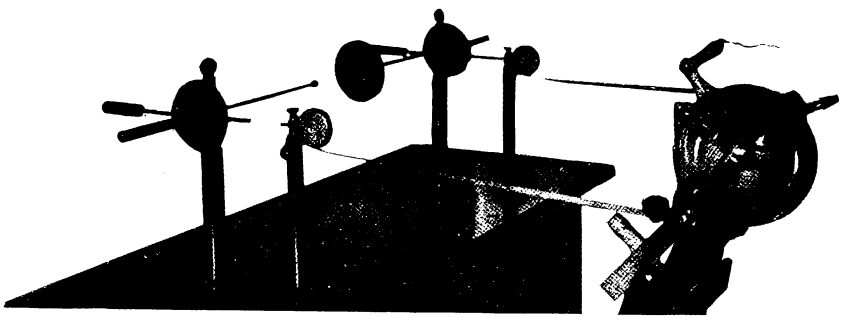


Fig. 49. The inverse spark gap on the left is open, on the right is closed.

operation is of a peculiar brilliancy that cannot be reproduced in crayons, water-colors, or ink.

When the vacuum of a tube is so low as to render it useless for radiographic purposes, a definite blue color can be seen here and there in the tube, the cathode stream can sometimes be seen appearing blue, and the line of demarcation between the active and inactive hemispheres of the tube is not well defined.

When a tube is punctured the vacuum gets very low, of course, and its appearance in operation may be as just described, or, as sometimes occurs, it gives rise to a fluorescence as variegated as a rainbow. A punctured tube can sometimes be repaired by the manufacturer.

When the vacuum of a tube is too high, the tube lights up reluctantly a very yellowish green, and the line of demarcation is not at all distinct.

Figure 48 illustrates fairly well the appearance of a tube with the current passing through it in the wrong direction. When this condition is seen the current must be turned off quickly, or the tube will be ruined. Sometimes, when the tube is properly hitched to the coil, light rings back of the target, similar to those shown in figure 48, may be seen. This

signifies that the coil is generating considerable inverse current. Recall that, while the current generated by the induction coil is practically a unidirectional one, there is an inverse current which is sometimes strong enough to manifest itself as just mentioned, especially when the vacuum of the tube is low.

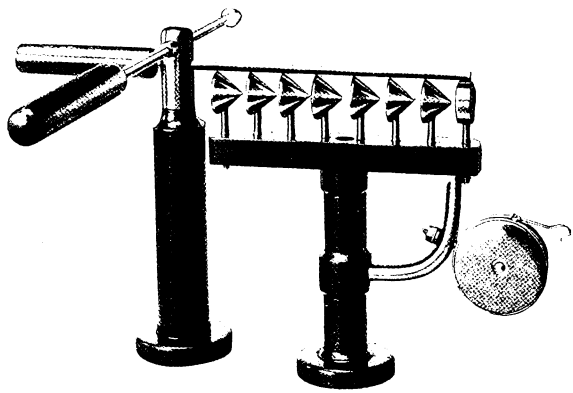


Fig. 50. Series Spark Gap.

Cutting Out Inverse Current.

There are several ways to keep this inverse current from passing through the tube. The simplest way is to make a spark gap between the coil and terminal tape, which gap, for want of a better name, I shall call the inverse spark gap, since it is used to cut out the inverse current. (Fig. 49.) This gap may be made at either the positive or negative terminal, or both, as is found necessary. It cuts out the inverse current because this current is comparatively weak, not strong enough to jump the gap and pass through the tube. The main current jumps the gap easily. Unless inverse current is observed in the tube there should be no inverse spark gap—the little sliding rods should touch the binding posts of the terminal tapes. (Fig. 49.)

Series spark gaps (Fig. 50) may be used between the coil and terminal tape to cut out the "inverse." The current passes easily from point to disc, but reluctantly from disc to point. Thus the series spark gap may be used to cut out inverse current from a tube, with the points towards the positive terminal tape and the points away from the negative terminal tape. Figure 50 shows the points toward the positive terminal tape. They should be turned in the opposite direction at the negative terminal—away from the tape.

The third, last, and perhaps the most efficient means of cutting the inverse current out of an X-ray tube is by means of a valve tube. (Fig. 51.) The valve, or Villard tube, is a tube of low, or, as it is often called, Geissler vacuum—1/1,000 to 3/1,000 of an atmosphere—with a disc electrode and a spiral electrode, both made of aluminum. The exact

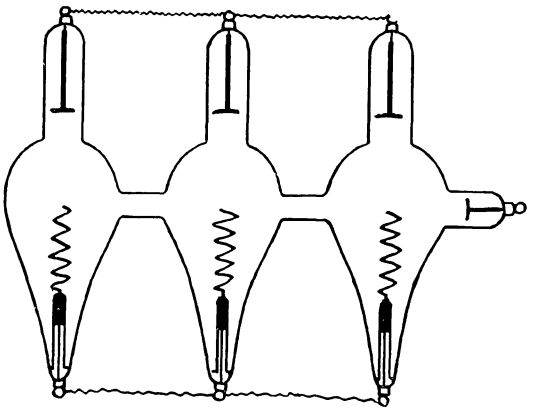


Fig. 51. A Triple Valve Tube.

reason for its action is not known, but the electric current cannot travel through it well except in one direction—from disc to spiral. Thus, to cut out inverse current the disc end of the valve may be attached to the positive terminal tape of the coil, and, by means of a piece of conducting tape, or wire, the spiral end connected with the target side of the tube. Or the disc end of the valve may be attached, with a piece of conducting tape, to the cathode side of the tube and the spiral end of the valve to the negative terminal tape of the coil. (Fig. 52.)

It is claimed by some that the valve tube acts only as an additional resistance to the flow of the inverse current cutting it out of the X-ray tube in the same manner that the inverse and multiple spark gaps do.

Oscillimeter.

The oscillimeter, or oscilloscope (Fig. 53) is a Geissler vacuum tube with two straight aluminum electrodes. When a unidirectional current passes through it a violet light occurs at the negative electrode. When an alternating current passes through it the light occurs at both electrodes. When the current sent through it is stronger in one direction than in the other the electrodes light unevenly, the brighter electrode representing the negative of the stronger current.

The oscillimeter is made to be used between the coil and the tube, when the latter is covered, to detect inverse current. I have never felt the need of it, though I use an opaque shield over my tube.

Demonstration of X-Rays.

As has been stated, the X-rays are not discernible to any of the special senses. Their existence, however, can be demonstrated as follows:

Place an X-ray tube in a wooden box so that when the current is sent through it no fluorescence can be seen. Excite

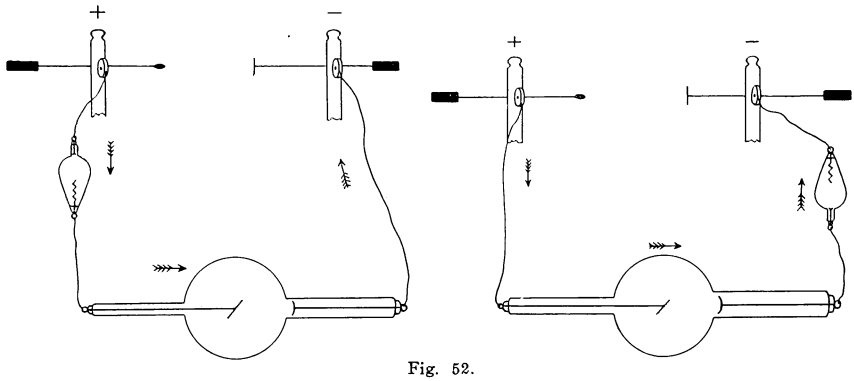


Fig. 52.

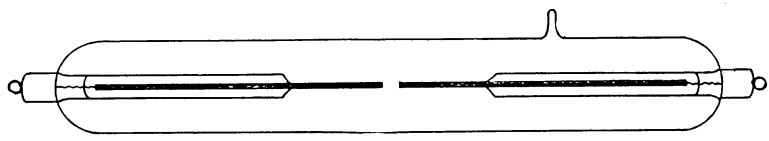


Fig. 53. An Oscillimeter.

the tube in a dark room and approach it with some object coated with calcium tungstate or platino-barium cyanide, and the object will be seen to fluoresce or glow something like phosphorous. This fluorescence is due to the action of the X-rays (which penetrate the wood of the box easily) on the calcium tungstate or platino-barium cyanide. Hence the closer the object to the tube the more and stronger the X-rays which strike it, and the brighter the fluorescence.

Power of Penetration of X-Rays.

X-rays from different tubes differ in length and power of penetration. A low tube gives the shortest and least penetrating X-rays; then comes the medium tube, while the X-rays from a high tube are longest and most penetrating.

The degree of penetration may be determined by means of a penetrometer. (Fig. 54.) This particular kind of a penetrometer consists of two small flat pieces of wood fastened together, with a sheet of lead between them. Holes are made through both wood and lead. Into these

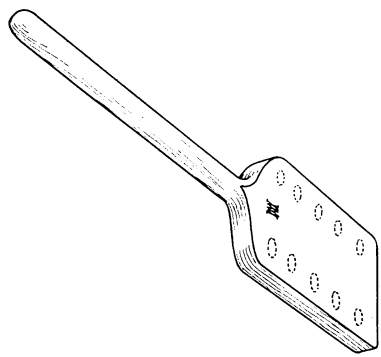


Fig. 54. The Meyer Penetrometer.

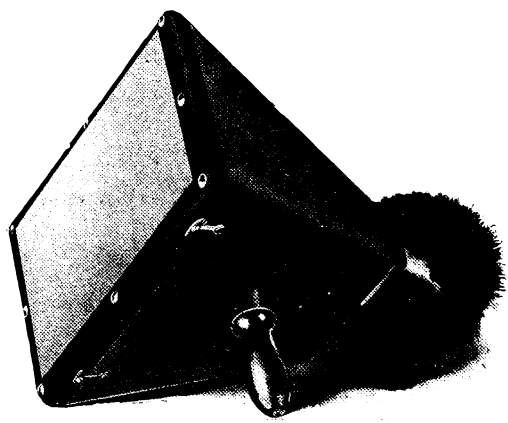


Fig. 55. A Fluoroscope.

holes are placed thin metal discs which just fit the holes. The different holes receive different numbers of discs.

To use this style of penetrometer we must have a fluoroscope. A fluoroscope (Fig. 55) consists of a light proof box, tapered and made to fit over the eyes at one end, and covered at the other end with paste-board coated with calcium tungstate or platino-barium cyanide. If one should look into the fluoroscope holding it toward ordinary light nothing could be seen—one would look into perfect darkness. But if the fluoroscope

should be held so that the X-rays struck its screen—i. e., the paste-board covered with calcium tungstate or platino-barium cyanide—it would be seen to fluoresce, or glow, or light up.

If now the penetrometer is held between the fluoroscope and the source of the X-rays a shadow will be seen on the screen, because the

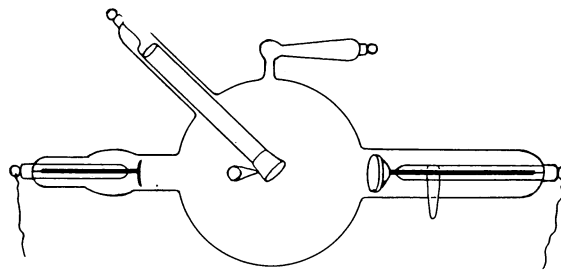


Fig. 56. High Frequency X-Ray Tube.

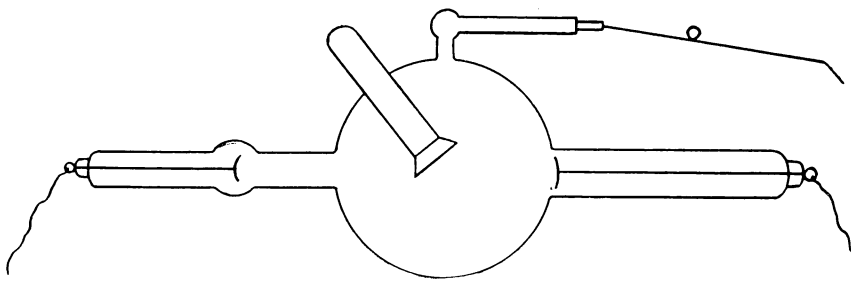


Fig. 57. High Frequency X-Ray Tube.

lead in the penetrometer is opaque to X-rays. Whether the X-rays will penetrate the metal in the holes depends on how much metal there is to penetrate and how penetrating the X-rays are. Thus the more penetrating the rays the more holes can be seen.

There are a great many different kinds of penetrometers. I shall not describe them here, but will give the scale of the two most popular, the Benoist and the Walter, together with that of the Meyer, (Fig. 54).

	Benoist.	Walter.	Meyer
Soft, or low tube	1— 2	1	1— 2
Medium	3— 5	2—3	3— 4
Hard or high	6—12	4—6	5—10

While the penetrometer is a very valuable appliance, it is far from being a necessity in the practice of dental radiography.

Secondary Rays.

As X-rays pass through the glass of the tube more X-rays are generated. These are known as "secondary rays." They are short and feeble and do not travel parallel with the direct X-rays, but pass

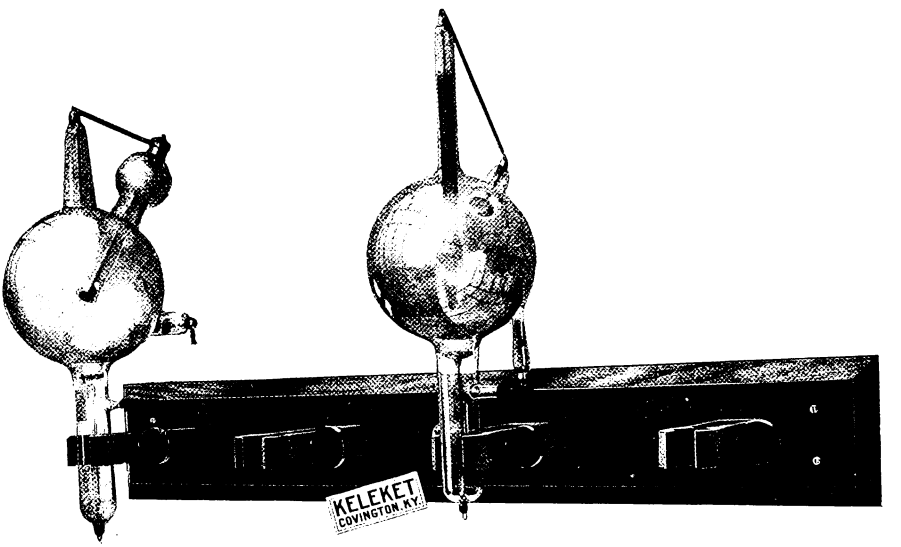


Fig. 58. Tube rack for tubes when not in use.

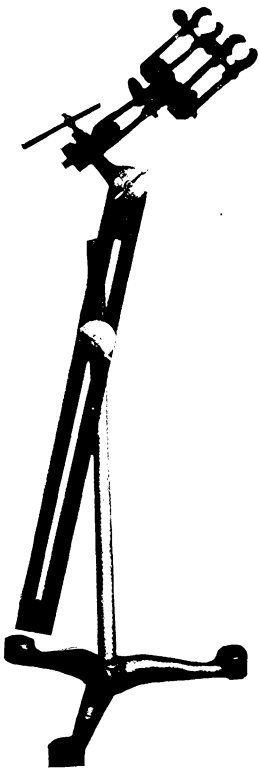
out from the tube in every direction intersecting the direct rays. Secondary rays are also given off from any object which X-rays strike. Thus, direct rays will strike a wall; secondary rays are given off from the wall and strike the other walls, the floor, and the ceiling, whereupon a new set of X-rays, tertiary rays, are produced. When the tertiary rays strike an object still another set of X-rays are generated, and so on, each new set of rays being much shorter and weaker than the former. So a room in which an X-ray tube is excited is filled with X-rays—not with the direct rays, but with the comparatively feeble and inconsequential secondary and tertiary rays.

X-Ray Tubes.

X-ray tubes are of different sizes. The bulb varies in diameter from five to eight inches. Thus we have the five-inch tube, six-inch tube, and so on. The six-inch tube is about right for dental work.

With use the glass of the active hemisphere of the tube discolors to a purplish color. This does not materially affect the tube.

The fatal injury to most tubes is a puncture. One means of guarding against punctures is to keep the tube clean. "A fruitful cause of



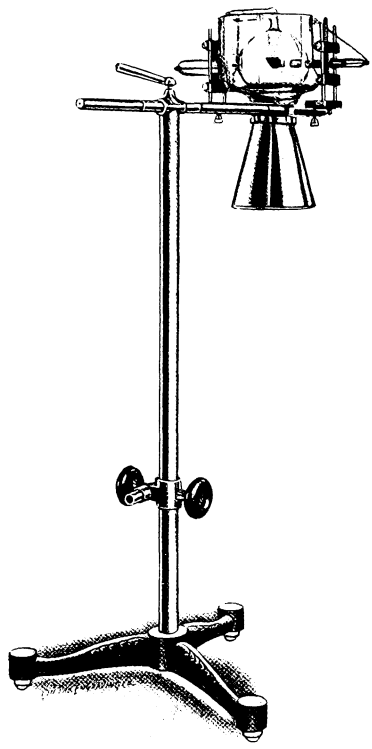


Fig. 59. Plain X-ray tube stand.

Fig. 60. Tube stand, with a lead glass protection shield and a compression diaphragm.

puncture is the discharging of the current from the tube into the rack on which the tube is kept when not in use. The tube may have been discharged by the operator touching the terminals before putting the tube away, but if the tubes are stored in the same room where high frequency and other coil discharges are taking place, they will recharge themselves from the atmosphere and discharge onto the rack, no matter of what material the rack may be made. A safe way of putting away tubes is to

connect the anode and cathode terminals together by a wire during the time the tube is at rest.

The general principle of construction of the high frequency X-ray tube (Figs. 56 and 57) are those already given in the description of the tubes built to be operated by a unidirectional current. The chief differ-

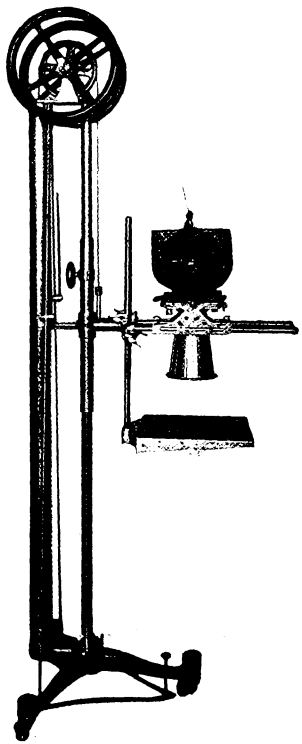


Fig. 61. A pedestal, with a lead glass protection shield, compression diaphragm and plate holder.

ence between the high frequency tubes and those already described lies in the different mean resorted to in the former to dispose of one direction or wave of the alternating current, or, to speak more definitely, one cathode stream.

Either end of a high frequency X-ray tube may be connected with either terminal tape of a high frequency coil. While this is theoretically true, it will sometimes be found in practice that the tube works better hitched up one way than the other.

When the tube is hitched up the current oscillates through it and two cathode streams are generated. One of the streams is focussed against the target and X-rays are given off from the focal point, while the other is focused into a funnel in the back of the target. (Fig. 56.) X-rays cannot be given off from this funnel; hence the tube lights up in the active hemisphere as illustrated in figure 47. This funnel scheme is

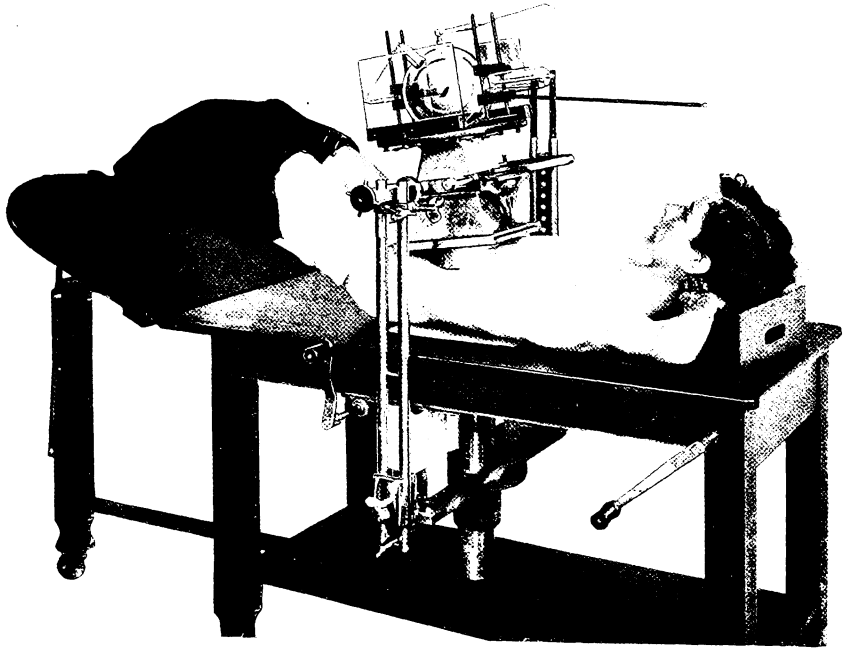


Fig. 62. Table, with a lead glass protection shield and compression diaphragm.

one way of taking care of one cathode stream while the other is being used for X-ray production. Another scheme is to move one cathode back so far that the cathode stream focuses before reaching the back of the target. (Fig. 57.)

The high frequency tube may be used to advantage on an induction coil which is generating a great deal of inverse current.

One may wonder why a valve (Fig. 51) or a rectifier (Fig. 27) could not be used to cut out the flow of current in one direction, and a tube like the one in figure 44, for example, used on a high frequency coil. Neither the valve nor the rectifier is capable of cutting out one

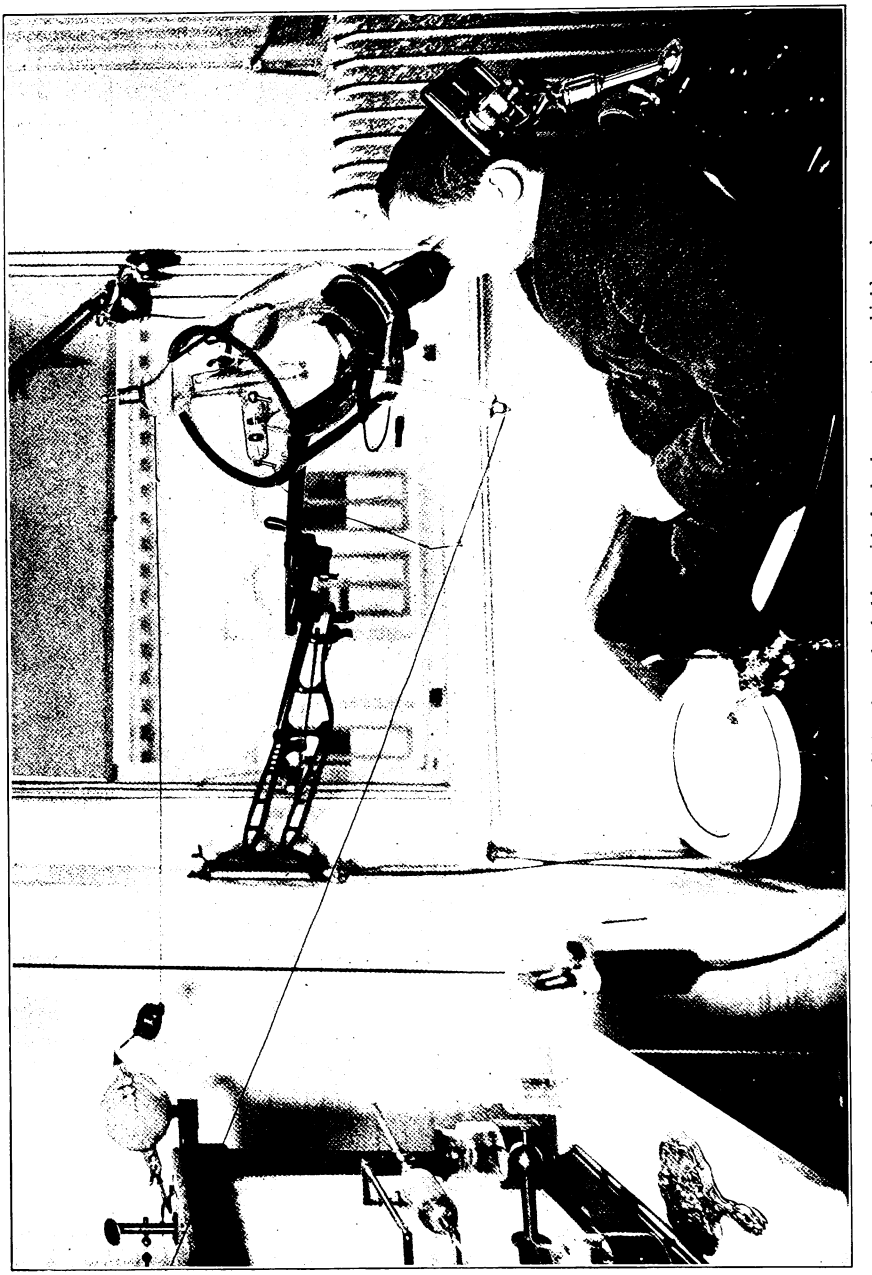


Fig. 63. Doctor Blum's wall bracket tube holder with lead glass protection shield and compression diaphragm.

direction of flow of a current of such high potential (voltage). The valve is able to cut out the inverse current of an induction coil because it (the inverse current) is comparatively weak; and the rectifier can cut out one wave of the commercial A.C., because the voltage is only a little over a hundred. The voltage of the high frequency coil is perhaps a hundred thousand.

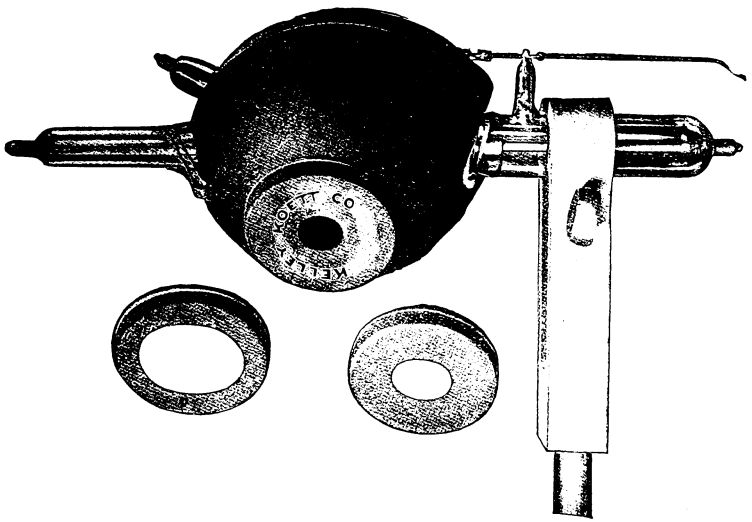


Fig. 64. A Protection Shield.

A valuable pamphlet, "Clover-Leaf Tube Pointers," by Henry Green, may be had for the asking. Green & Bauer, Hartford, Conn.

To avoid "straining" a tube, it should not be again used, after having been used till hot, until it has cooled thoroughly. Overheating the tube will destroy the gases in it, and so raise the vacuum to such a degree as to make it impossible to force a sufficient milliamperage through it to produce good X-rays. Sending a very strong current through a tube of low vacuum will also destroy the gases of the tube and spoil—strain—it.

Figure 58 is a tube rack for holding the tube when not in use.

It is obvious that there must be some kind of a device for holding the tube when in use. This may be either a plain tube stand (Fig. 59), or a tube stand with a lead glass, protection shield and a compression diaphragm (Fig. 60), or a pedestal with a lead glass protection shield, compression diaphragm, and plate holder (Fig. 61), or a table with a lead glass, protection shield and compression diaphragm. (Fig. 62.)

Dr. Blum, of New York, uses a wall bracket fixture to support a lead glass, protection shield and compression diaphragm. The tube, one of the water-cooled type, is seen fitting into the lead glass shield. (Fig. 63.) This would be, I imagine, a very adaptable and satisfactory apparatus.

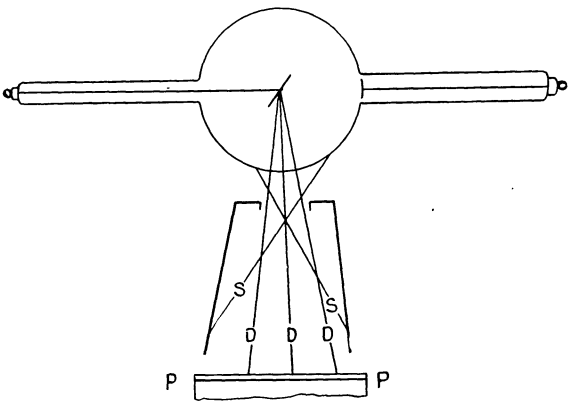


Fig. 65. D D D, direct ray. S S, secondary ray. P P, part.

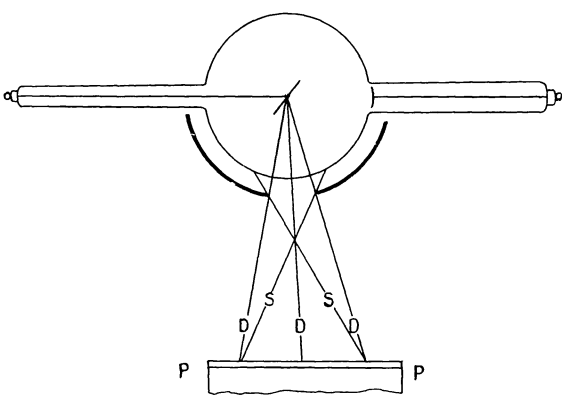


Fig. 66. D D D, direct rays. S S, secondary rays. P P, part.

A tube stand should be heavy enough to be firm and not allow any vibration of the tube while in use. The parts coming in contact with the tube must be made of an electric non-conducting material; otherwise the current would pass from the tube into them, so puncturing the tube.

The uses of the compression diaphragm are: To hold the patient

immovable; to compress the soft parts as when making a picture of the kidney, for example; and to cut out the secondary rays given off from the tube.

A protection shield, often called a Friedlander's shield (Fig. 64), which is opaque to X-rays except for the window or opening in it, and which is used to cover X-ray tubes, also cuts some, but not all, secondary rays given off from the glass tube. Thus if the X-rays from an X-ray tube are directed on a part through a diaphragm, only the direct rays strike the part, as in the diagram study shown in Figure 65. While, with the Friedlander's shield, *some* of the secondary rays might strike the part also. (Fig. 66.)

A Reply to Dr. Kulka's New Chemical Experimental Studies.

By MAX SCHREIBER, Dentist, Berlin W.—Schöneberg.

About two years ago I thoroughly criticized the "chemical studies" of our colleague, Dr. Kulka (Vienna), especially emphasizing the fact that I use a mixture of cement powder and cement acid of a high basidity, *i. e.*, of a minimal acidity, compatible with the safety of the tooth to be filled. Kulka asserts that I limited myself to a discussion of the constitutive properties of the powder and of the acid. I must deny this assertion and leave the truth of the matter in the hands of the unbiased reader.

So also, his new research "On the Possible or Pathological Action of Cement Fillings," which has at last appeared and which was printed in the "Oesterr. ung. Vieteljahresschrift für Zahnheilkunde, 1911, Heft 1,* and must be analyzed and dissected thoroughly, inasmuch as he renders a verdict on all other works on this subject in a manner really not customary in the scientific world. Kulka's article has also been abstracted in several journals, and been referred to by others.

Dr. Kulka's Theory of Hardening.

Let us see in how much our colleague Dr. Kulka is justified in the "advancement of his own knowledge." In my article "Critical Studies of the Latest Works on Sicilate Cements" (Forts. der krit. Stud. D. Z. W., 1909, Nos. 15 and 16) I put the Kulka hardening theory under the magnifying glass, because upon this theory he based the conditions necessary for the construction of a useful dental cement. I came to the conclusion at the time that not once did

*My conclusions in this matter are obtained from a specially printed copy which was kindly given to me. Mechitaristen Buchdruckeri, Vienna VII.

he give the slightest proof of the correctness of his ideas. I now expected that our colleague Dr. Kulka would accomplish something for his hardening theory. Not so! Rather, he considers it superfluous to speak of a hardening theory, since this is a matter which concerns the cement manufacturing chemists. Cannot Kulka give me a different answer than this to my criticism? Apparently not! I am and will remain of the opinion that a real hardening theory is not only the basis for the understanding of the peculiar physico-chemical process of hardening, and consequently the key to the solution of the real cause of poisoning by the use of many silicate cements, but also the *conditio sine qua non* for the study of the chemistry of silicate cements. From his silence on this subject I must conclude that he is not prepared to defend his hardening theory; *i. e.*, that theory upon which he formerly founded his whole series of experimental studies, and with the help of which he ascertained the "quality" of a dental cement.

Free Acid in Cements.

Colleague Dr. Kulka charged the manufacturers of Phenakit with considering the properties of the cement powder and cement acid separately, whereas they should be discussed as a mixture. The falsity of this statement was pointed out by me at the time, and I particularly advocated the value of weakly acid cement mixtures. I also emphasize and again repeat that if we employ a cement embodying a strongly acid liquid there is always the danger that a portion of the acid may remain free and thereby cause an irritation to the tooth pulp. If, however, *as with Phenakit, the liquid is a salt solution, then this danger does not exist, since the surplus of a salt solution never can have the destructive action of a strong acid.* From this it follows that the quality of the components is always an important factor. As I have already mentioned, and quoted from Kulka's own words, that formerly the composition of the components of a cement was by no means indifferent to him. In contradiction to this fact Kulka asserts that "proper cements for our use must be compounded in such a manner that, regardless of the properties of powder or liquid before mixture, the combination of each in right proportion will give a cement containing but a minimum of free, active acid."

To my satisfaction I now see that Kulka refers to his earlier views on this subject by repeating word for word: "If, however, a cement for filling purposes is prepared too thin, then, in consequence of the protracted setting free of the acid, certainly enough free acid remains to act upon the dentine and tubuli." (Special copy, p. 16-17.)

In vain, however, do I search in his paper for the logical conclu-

sion: "Since Phenakit, in contrast to all other silicate cements, has a weakly acid salt solution as its liquid component (a fact of great advantage), as a consequence, even with a thinly mixed quantity, a damaging action on the pulp is not to be feared."

Kulka puts forth the supposition that the silicate-cement liquid contains "orthophosphoric acid" and also "free phosphoric acid." I have already stated that free phosphoric acid cannot be considered at all—but aluminium phosphate must be. This grave mistake is yet small in comparison to the mistakes which he commits in his "quantitative determination." We should remember the warning given by Morgenstern (D. M. f. Z., Jahrg. XXVI, Heft 4, and Oesterr-ung. Ztschr. f. Stomatologie 1908, February Heft), especially the words: "It is a mistake to subject prepared cements, for experimental purposes, to the various chemical and mechanical processes before they have fully set, for thereby very valuable properties are lost and false conclusions result." Notwithstanding this Dr. Kulka again does not consider the fact that the question here concerned is cements; that is, substances which have to undergo a series of hardening stages, which at times last hours or days. During this setting time they are very sensitive to chemical agents, especially to water; through the latter they are not only disturbed before setting, but even decomposed in part. The newly formed products will differ, depending upon the various cements used.

Dr. Kulka's Methods Criticized.

Colleague Kulka takes about 1 gm. of the not yet hardened mass, in part right after mixing, pulverizes this mass, mixes it with about 150 c.cm. of water, lets it act on the cement mass in pulverized form, whereby naturally a large part of acid affinities soluble in water are extracted. This solution he titrates, *i. e.*, in his opinion he determines then the content of free phosphoric acid in the cement mass, and forgets that the largest part of that which he determines in all cases has only formed secondarily and was not contained in the original mass. Through the action of the water the various cement masses will yield various decomposition products soluble in water.

Through Dr. Pawel's experiments on animals the poisonous action of aluminium phosphate has been proved, and it is therefore a poison. And even though some pulp deaths cannot be traced bac . to one or the other silicate cement containing aluminum phosphate, yet in handling them we are dealing with decidedly poisonous materials, the use of which should be avoided, since it is an established fact that, with every precaution, failure has occurred. In truth it is to be wondered at that Colleague Kulka gives this possibility so little consideration, but explains only the others.

SOCIETY PAPERS



The Scientific Casting of Gold.

By W. H. Taggart, D.D.S., Chicago.

Read before the Second District Dental Society, December, 1910.

It hardly seems possible that it has been four years since I first came before you and delivered to you my message.

And to-night I come again and ask in all seriousness: Did you heed that message? The fact that some thirty thousand in the United States are to-day casting most of their fillings only shows that the underlying principles of this process must have been right and of unusual strength, or else they would have been discarded long ago, owing to the careless and unscientific manner in which these principles have been used.

The subject of my paper to-night is "Scientific Casting of Gold," and while the title sounds big and roomy, and apparently would permit of endless writing, as a fact my message will be brief and simple. It takes but a short time to state the facts and explain the basic principles of any mechanical process, but the amount of time consumed in trying to find some principles or theories to explain certain conditions is considerable.

The conception of an idea that a certain thing is needed in a business, which has been lying dormant for years, is the very basis of invention, but as it cannot be delivered at so much a pound, some are not inclined to appreciate the scientific merit of the complete idea, but will introduce a crude *conception* of this idea into their business, reap a big reward themselves, and then condemn the one who gave them the information.

I say this in all earnestness, because thousands to-day are casting, and yet are not doing it according to any scientific law.

I do not believe there ought to be a separate car on the surface lines for those who do not think as I do, but I feel that when a new idea is presented, and has merit enough to be adopted in our daily practice, it should at least be used according to directions until those directions are proven to be erroneous.

Scientists in other lines than ours invariably follow the minutest detail of the technic of the one making the discovery, and then draw their own conclusions. If they do not follow thus closely what has been presented to them, they certainly are not scientists in a true sense.

What right would anyone have to say that our Miller or our Black were wrong in their theories of caries, if he did not carefully follow the details which led up to these theories?

With these few preliminary remarks, I will try to correct some of the errors which have crept into the casting of gold as used for dental purposes.

A good definition of science is: "Knowledge gained and verified by exact observation and correct thinking." Scientific—"pertaining to science."

The different heads into which the subject of scientific casting of gold has been divided are: Preparation of cavity; wax and its treatment; investments and their treatment; flasking; gold and its proper manipulation, and mechanism for accomplishing results.

Cavity Preparation for Inlays.

The preparation of the cavity will not receive any extended consideration, but it is coming to be recognized that the same general rules laid down by Dr. Black for the preparation of cavities in which gold foil is to be placed are equally good rules to follow where cast inlays are to be used.

During the first two years of the cast inlay period, when the gold foil enthusiast was having his pins knocked from under him and having to formulate objections to the new idea, there was considerable talk about the amount of tooth structure which had to be sacrificed in properly preparing a cavity for a casting, but as time has passed and the cast inlay is recognized as orthodox, these objections have gradually faded, and are now only used by those who pride themselves on the fact that they never try anything new.

I had occasion a short time ago to see an enlarged model of fourteen teeth, with twenty cavities prepared, all according to Black's plans. This model is used by professors of operative dentistry to teach the students the proper preparation of cavities for gold foil fillings, and, aside from the undercutting in these cavities, which is not desirable

for cast work, there was not a cavity preparation that would not have been correct for a cast filling.

In my relations with dentists who have adopted the cast work, I find it is very hard for some to adopt new ideas in regard to the tools to be used in humanely preparing cavities. You will probably remember that at the time when this subject was presented to you I said that any cavity to be prepared for a cast inlay could be better and more humanely done by the use of stones instead of steel tools, and I have had no occasion to change this idea, as fully ninety-five per cent. of cavities are prepared in my office in this way. The use of stones prevents one very serious condition which is apt to happen when burs are used, and that is that unconsciously one is apt to make slight undercuts with steel tools which are hidden hindrances to the proper removal of the wax.

Wax and Its Treatment.

Have you seriously considered how absolutely essential the proper wax pattern is in the making of an inlay? To be scientifically correct, a wax must be of such a nature as to be sluggish in its movement, and which, at the temperature of the mouth, will absolutely break before it will bend. Without this quality there is no certainty that it has not become distorted, especially in complicated cavities.

With soft waxes and the use of cold water one can get fairly good results in ordinary cavities, but where there are any complications, such as we find in M. O. D. (mesial-occlusal-distal) cavities, the wax, as soon as the cold water is withdrawn, almost immediately resumes the temperature of the mouth, and while it may be easily withdrawn from the cavity, there is no telling to what extent it may have been bent, and this condition will not give you a high percentage of successes in just the places which should be the most accurately filled.

I made eleven hundred and fifty different mixtures of waxes and gums and did not succeed in having continuously successful results until a wax was obtained which possessed the foregoing properties, but others seemed to think it required too much effort to get it to a workable condition. From the start it was found that the uniform plasticity throughout the whole mass could best be obtained by warming in hot water, but in trying to do this in a hurry the surface was made softer than the internal mass; yet if sufficient time was used to allow the whole mass to be thoroughly heated throughout, excellent results were obtained. To surmount the problem of heating the wax properly, I have devised an automatic electric heater, which will now be shown to you. When the instrument is set to work so as to give you the proper degree of plasticity, it will always duplicate this temperature, but it must be

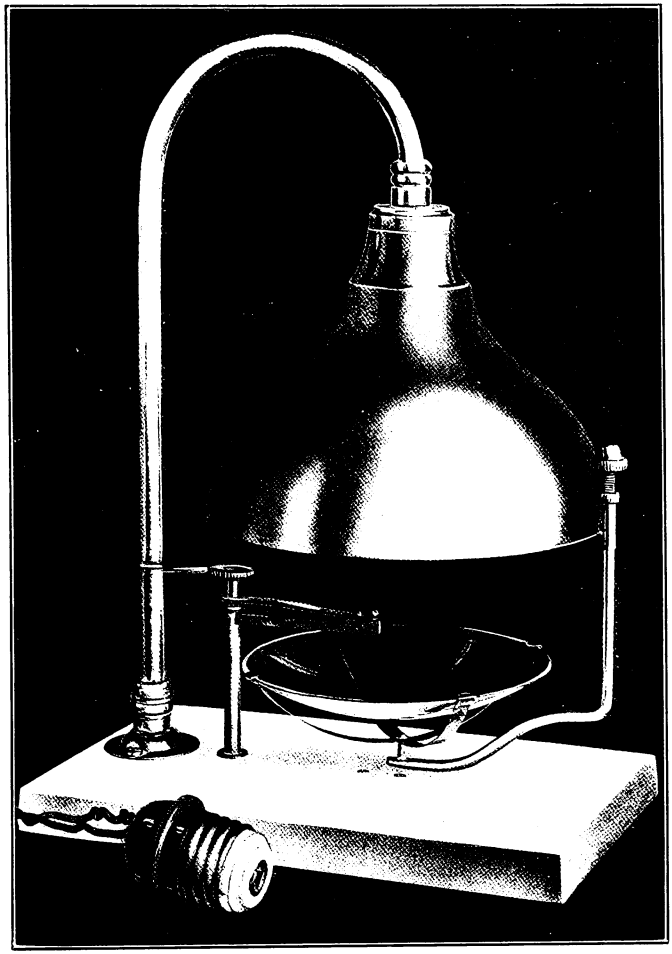


Fig. 1. Electric automatic wax warmer.

allowed time to arrive at this correct temperature, and by making it automatic this can be accomplished to a nicety. As soon as I commence to prepare the cavity, the heater is started, and this gives ample time for the wax to be thoroughly warmed throughout its mass, so that when the cavity is finished the wax is ready to be used, with no loss of time, with annoying conditions removed, and with continuously duplicated and

gratifying results. This instrument has certainly brought the moulding of the wax pattern down to practically a scientific basis.

This instrument (Fig. 1), which I call an automatic wax warmer, has as a heating element a 16-candle-power lamp, with a carbon filament. The carbon filament is being abandoned for lighting purposes, because it furnishes more heat than light. The Tungsten filament furnishes more light than it does heat. For that reason I have used the carbon filament to furnish the heat.

The principle on which it works is this: We have here a glass disc, which we can turn to one side in order to place our wax on it. On account of the heat all coming from one direction, a metal disc or surface that was flat would receive heat upon its upper surface, and the under surface of the wax would be cool. I found that one of these disc glasses is thin enough so that as the heat strikes it, it is reflected back so that the under side of the wax is warmed as well as the upper. I have had wax on here for fifty-six hours at a time, and when I examined it, it was plastic in its mass, and no more heated on the upper than on the lower side.

The electric heating apparatus was hard to control automatically if the current were allowed to go in a continuous path, but by adopting the principle I have used here, of having the heat all on or all off, it permits the intermittent heating of a thermostat. It heats the thermostat, and as soon as it gets a little too warm it breaks the electric circuit. As soon as the electric circuit is broken the thermostat begins to cool down, and the thermostat throws the current into the lamp again. It works by excessive heat, and it shows there is not a one-hundredth degree of difference in temperature between the surface on one side or the other. Sometimes it will flash 50 or 60 times in a minute; sometimes slower. The reason is, it is a very sensitive test of the voltage that is passing through the wire. You have often noticed that when the lights would go up high it would make your room light enough. When the current is at a high voltage the lamp is heated more, and that works the thermostat quicker, and as soon as it is worked quicker it immediately drops down. The dancing you see is worked by that voltage.

The wax is placed on this glass disc and the even temperature throughout the whole mass has a great deal more to do with the correct moulding of wax in a tooth cavity than you think. It is peculiar, but a soft, wobbly condition of the surface of wax will invariably make it shrink from the cavity walls; whereas, if you have a wax of uniform texture, it will move to its place in an exact way, and there will be no change in form when it cools off.

Investments for Cast Inlays.

The next subject is that of investments. This problem seems to have called more loudly for help than even the wax problem did, and justly so, as after the pattern, which must be accurate, the mould must be scientifically correct. A great many of the faulty adaptations, aside from those caused by distorted patterns, come from improper investments, or good investments improperly handled.

One writer has given you several pages of meanlingless statistics about investments, and for the life of me I have not been able to fathom their meaning, because if investments are tested under conditions which should never be allowed, no number of pages of statistics can make me think that this would be a scientific treatment of the subject. For instance, temperatures of one thousand degrees are mentioned, when, as a matter of fact, such a temperature is so far beyond the requirements that the article loses weight as a scientific treatise. The temperature required in order to do scientific casting should never be higher than just enough to burn out the wax. Anything beyond this is absolutely harmful and brings the investment to a temperature where the ingredients themselves are burned, and give off gases which are very objectionable in a mould.

The temperature in the flask at which casting should be done has not been thoroughly understood. A hot flask is an expanded flask, and an expanded flask means an expanded hole inside, and an expanded hole means a misfit casting.

I think one of the most scientific reasons why I have such continuous satisfactory accuracy of fits of my cavities lies in the fact that I never cast in a mould hotter than the temperature of the room. In other words, always allow the flask to become cold. This gives you two conditions, both important. One is, the mould is not distorted, and the other is that the metal flask, in being allowed to come back to a normal temperature, hugs the investment tighter and gives it a support which is very helpful in resisting the pressure from within.

Most of the handling of investments is done in a very unscientific way; as a rule, there are no two times when the conditions are made the same. You should make experiments in sufficient number to determine the correct quantities of water and powder, and then invariably duplicate these proportions, else how are you to get uniform results? There must be some proportion of water and powder in any investment, good or bad, which is the correct one for best results with that particular investment, and when this is determined you should invariably duplicate it. This can only be done by weighing the ingredients and not by measuring, as it is impossible to always get the same quantity of powder in a vessel

unless it is weighed. A little pressure or tapping will alter the quantity away beyond reason. From the start I have insisted on exact weighing of both water and powder, and this accounts again for a high percentage of uniform results in my work. A rule of thumb method will never accomplish scientific casting. A little water and a little powder, and if too thick a little more water; and if this time it is too thin, then a little more powder, will never give you two mixtures alike, and if the consistency of your mould is not twice alike, you certainly cannot duplicate your casting results.

A good investment should be so compounded as to make it possible to pour it into the flask, and have plenty of time to know that the wax is thoroughly surrounded. A thin investment also allows the contained air more easily to escape. When I was using a thick investment and manipulating it hurriedly, as was necessary, I would find pimples on the gold far in excess of what I thought was caused by the contained air in the plaster ingredient, and I came to the conclusion that gases must be evolved after the investment was in its place in the flask. By making a proper mixture of ingredients, it now allows me to so manipulate the material that any contained air or gases are allowed to escape before the flask is filled.

In order to easily weigh and mix investments to get uniform results, I have devised several instruments, and I think you will admit that continuously uniform results can be easily obtained and scientific casting given a big boost.

Investment Mixer.

This apparatus was among my first instruments for mixing investments. (Here Dr. Taggart exhibited a weighing and mixing device.) It is an open tube, and a movable other end to the lever. In the centre we have the fulcrum. Here we have a movable weight. Imagine the fulcrum here (indicating). On top of it I have a spirit level. Without that it would be impossible to tell with the eye whether this end or that end was too low. If either condition existed you would not get correct proportions of water and powder. As soon as the spirit level comes to a centre, that is the correct amount.

This is a movable weight between two nuts. When it is here to the left there is a certain amount of powder, and here to the right there is a certain amount of liquid. I will give you a mix of this investment, and show you how I do it.

This spirit level shows the weighing beam is level. I now move this weight over to the right side. That brings it out of balance. By squirting the water in here, and bringing it back to balance, we have the correct quantity of water.

Those two ingredients are in there in the proper proportions, and those conditions can be duplicated every time, and after you have found the proper proportions you can see the advantage. It is liquid enough to shake it and get the ingredients properly mixed.

The element of time comes in. These gases seem to be evolved from the chemical action of the water on the plaster, hence the liberation

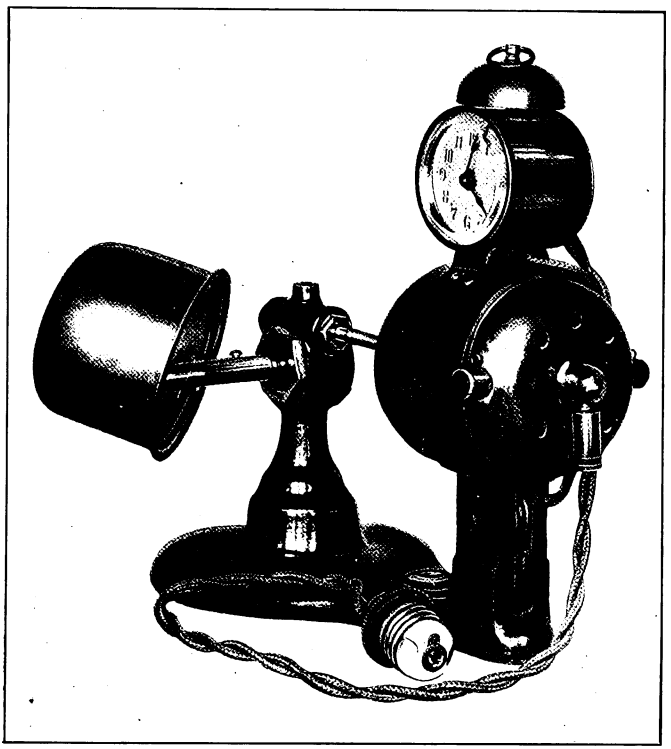


Fig. 2. Electric automatic investment mixer.

of contained air and gases. This plaster taking up the water, whatever gases or contained air there may be in the powder or water, are given a chance to be eliminated by rolling it from one end of the tube to the other, and giving it a slight tap occasionally. As you roll it in this way the gases come to the surface. They have a great attraction for the water, but a little tap or jar will break them loose, and you commence over again and give this rotary motion. Three or four minutes of time can be consumed in this way, and the investment is still in a workable condition.

When it is ready, the inlay which is on the crucible former is carefully painted over with a small camel's hair brush, so there is no air pocket concealed in any angle; the investment is then poured into the flask. It is in a liquid condition, and is absolutely free from all the gases and bubbles that have formerly annoyed us, and which invariably caused the little nodules of gold on the surface of a filling. You can easily see how a thick investment could confine this air, and the air, having some buoyancy, will rise somewhat, but it has not enough buoyancy to come out, especially when it strikes the under side of the inlay. Any jarring of the flask at this time is the worse thing you can do, because the colonies of small bubbles of air and gases all congregate and cling to the under side of the wax pattern. The investment stays thin like this for ten or eleven minutes, and you say to yourself it is so liquid it never will set; you turn aside for a moment and forget it, and when you look again it is set. It changes rapidly from a liquid condition to a solid condition. At the end of twenty minutes it is ready, even when mixed in this liquid form, to place on the fire.

In order to mix these ingredients properly I felt as though this instrument was rather crude, and that a more accurate and automatic instrument could be made, which I will now show you (Fig. 2).

Here now is the vessel in which I mix these ingredients. Here is a spring that allows this rod to be shortened. It was put in a little hole in that side, and one on this side. In the other device there was a chance to change the length of the lever in the scale beam. In other words, in dropping the powder in here the bulk of it would pile up on one side. That would make the beam here longer, and you would not get a true measurement. If you could get it always absolutely in the centre it would weigh properly. The liquid takes care of itself. I made a movable joint in this, so when the powder is put in it tips it over and brings the centre of gravity below the point of support.

This instrument is handled in this way: I hang it on the fulcrum. This arm has a spirit level in the top, the same as the other. This weight is pushed to one side, the powder is placed carefully; you must remember a little too much powder or too little water will make it of such a consistency that it will not roll in the container, but will become sluggish and mushy. We now move this weight to the other side of the scale beam. Water is poured in until it comes to a balance again. This spring is removed and the lid placed on and it is shaken so as to get the ingredients mixed. You notice the arm leading off from it is placed at an angle. This is placed on the motor, and we have a cog motion here which reduces the speed of the container to about sixty revolutions a minute. This mechanism is an automatic one. In my work I allow five minutes

for the mixing. Five minutes is better than three minutes, because every chance is given the gases to escape in this time, and with five minutes to spare you can be doing other work. I take the wax inlay after it has been placed on the sprue wire, start this automatic instrument and then do the artistic carving and finish up the wax filling; and often I have plenty of time to do all the carving that is necessary while this mixing

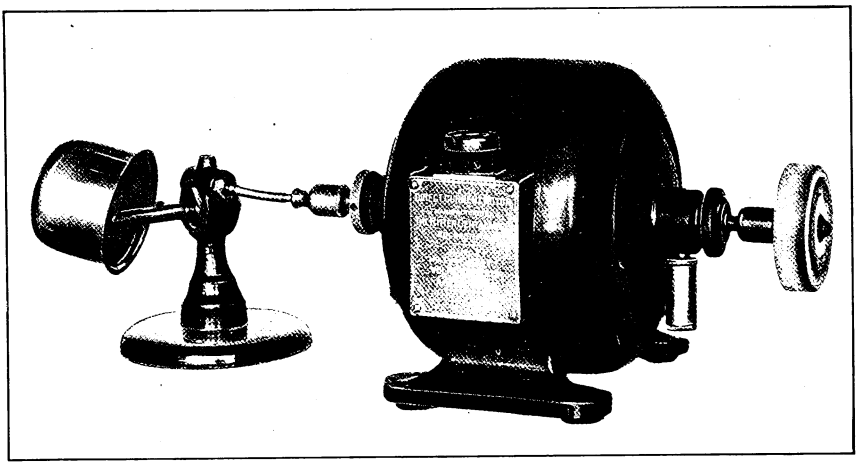


Fig. 3. Automatic investment mixer; attachment to lathe.

of investment is going on. By setting the clock at five minutes the mechanism revolves. You notice that little jerking motion each time. That jar is to burst the air bubbles, or gas bubbles. You can see how that being switched around—with all due respect to the vaudeville show from Brooklyn this evening—there is a "hoocheecoochee" movement here that is very conducive to mixing. The bell rings, and you notice the machine stops automatically. The automatic device for stopping that is nothing more than a snap switch placed on the alarm end of the clock, so that the alarm movement is the one that throws off the switch.

Now the material is ready to be poured into the flask. It is of a much better consistency even in the few minutes I have just mixed it—freer from air bubbles—than any way I can mix it. If it is jarred in a more violent manner one is apt to pump more air into it.

As you gave applause to the Spanish dancers to-night, I can best show you that peculiar movement I spoke of, which you were all so pleased with. By allowing the disc to revolve alone you will notice the

angle at which the container is set is continually changing, which keeps the liquid investment constantly changing its place and spreads it in a thin layer on the inside, and the jar bursts the gas bubble.

Here is another automatic mixer (Fig 3) that can be connected with any of the lathe motors. This is a Ritter. This machine works on the

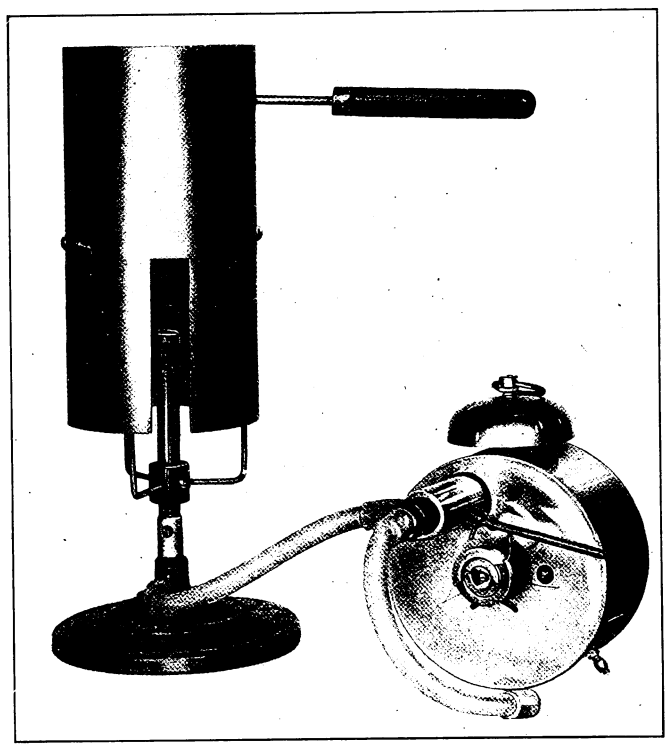


Fig. 4. Automatic (gas) burner for removing wax pattern from mould.

same principle as the other. As the mixing goes on for the requisite number of minutes the clock movement goes along, and you get that jarring motion which you see now. The fact that you get an alarm, which is loud enough to draw your attention to the fact that your work is ready, is better than the assistance of anyone—even yourself—in the mixing. It enables you to do the work identically every time.

Method of Removing Wax from Mould.

Our case is now flasked, and please tell me how many times you have burned out your wax twice alike? This being a process which takes considerable time (it not being considered necessary to watch it), one is quite apt to overheat and spoil the mould by forgetting it, sometimes leaving it on the flame for hours. If continuously duplicating conditions, as I have previously outlined, is of any importance in scientific casting, it is equally so in the simple burning of the wax, and I have devised a burner for this purpose, and as it is done automatically you can see what a time saver it is.

Automatic Apparatus for Burning Out the Wax.

In this instrument (Fig. 4) I have three different degrees of flame. If you are very careful with the first low heat you put on, and give it plenty of time for the water to be evaporated out of the investment, afterwards you can put on as much heat as you want and as fast as you like.

This low heat does not mean anything unless it is confined. The swaying of the flame by draughts would mean you would get one temperature at one time, and another at another. I put this tube over as a chimney to make the flame come to the top always and not be swayed.

On the back part of another alarm clock we have a disc which has three steps and a valve of special construction. This level first rests on the first step, and as you set it for five minutes the clock moves at that low heat, and then drops on to the step next higher. That temperature is kept up for another five minutes, which precludes the possibility of any further moisture which might suddenly burst and destroy the investment. As time goes on—another five minutes—it drops off, and it goes up another step. That, we will say, is the third and highest temperature. At the end of that time another five minutes having elapsed, the switch goes off and the flame goes out.

Gold for Casting.

The next phase of the subject of scientific casting will be about the gold itself. If there is any one thing more than another which has hindered the scientific casting of inlays, it has been the eagerness of the dentist to use all of the old refuse gold about the office, and sometimes, in case of poor collections, I have known them to add just a small part (they say) of sister Mary's near-gold bracelet, which she purchased with trading stamps. Let us take up the question of how much is saved on an average-sized filling, say as large as one and a half pennyweights; you would save ten cents if you used pure gold scrap. If you used 22

karat scrap, you would save fourteen cents, and on 20 karat scrap you would save about sixteen cents on the filling. For a filling of this size you ought not to get less than ten dollars, nor more than a hundred. Now, let us see how this figures as to cost. If you have failures on account of using bad gold on a 22 karat scrap filling at ten dollars each, you would have to make seventy-one and three-sevenths fillings, and on the one hundred dollar filling you would have to make seven hundred and fourteen and two-sevenths fillings to come out even on that one failure. As real ethical, scientific, artistic, humanitarian, and opposed-to-patents dentists, can you afford to prostitute yourselves to this extent?

So much for the commercial side. Now, as to the scientific aspect of knowledge gained and verified by exact observation and correct thinking.

Dental golds are alloyed with either silver or copper, and in case of solders, zinc is used. It is a well-known fact that silver and copper, or any baser metals, readily absorb gases when melted, and these gases, principally oxygen, form oxides of the metal, and on cooling evolve these gases, which causes the blow-holes, or porous cast; and the elimination of these absorbed gases also causes the sputtering you have noticed in alloyed gold, and which does not occur when pure gold is used, as pure gold when melted does not absorb gases; consequently, when cooled from the melted condition, it has no gases to squeeze out, and it is necessarily exceedingly homogeneous.

While we have always known that platinum is non-oxidizable, and might have properties helpful to gold, it must be borne in mind that platinum at these high temperatures has a very great affinity for silicon, and a piece of pure platinum melted in a crucible, with but a small portion of silica, will become very brittle, which possibly accounts for the brittleness of clasp gold when cast, as clasp gold is supposed to be alloyed with platinum.

All of these conditions I have found out by practical experience, and have had them verified by expert metallurgists. What do these experiments mean? They mean that if you wish to make cast inlay fillings in a truly scientific manner you must use pure gold. There are a great number more of clinical reasons for doing this, which will possibly be brought out in discussion.

What are we to do where we must have more strength, as in bridge spans, plates, etc., etc.? Choose the lesser of the two evils and use coin gold, which is alloyed with copper, and if not melted over and over again the gases do not injure its ultimate structure as they do silver, zinc and platinum.

Casting Against Pick-ups.

I wish to tell you one more principle about gold, and casting it to other pieces of gold which are in the flask.

Without any experience except that gained by blow-pipe work, the first thought which seems to come to dentists when they wish to cast against gold is to bring both the golds to as near the same temperature as possible. This process, gentlemen, is absolutely defeating the object sought. Why?

In bringing the flask and its contents up to a bright red heat you bring the enclosed metal to a temperature at which it oxidizes, and, having no means of deoxidizing this surface, you do not get as perfect a union when the melted gold is thrown in as you will if you heat the case up to a temperature just sufficient to burn out the wax. And this temperature does not absolutely burn all the carbon off the enclosed gold, and as carbon is one of the very best deoxidizers, you now have your gold in the very best condition to be welded to other gold. Now, the thing to do, in order to cast to this gold, is to bring your melted metal up to an excessive temperature, and you will cast in a scientific manner.

This subject is so fascinating, and there are so many ramifications, it is almost impossible to live up to a resolution I made when a mere boy, and that was, that if I ever became a preacher I would not preach over ten minutes.

Pressure.

Only one more thought and I am through with the subject of scientific casting. This thought relates to pressure used in casting. I think you will all admit that there can be a pressure too low to do accurate casting, and also that there may be a pressure too high, and, admitting this, can you not see that there must be an intermediate pressure which is just right, and which can only be obtained by automatic controlling mechanism?

Conditions Simulating an Alveolar Abscess.

By Professor Carlton N. Russell, M.D.,D.D.S.

Read before the Southern Dental Society of New Jersey, February 15, 1911.

In the presentation of this paper it is the object of the essayist to broaden the surgical vision of the dental practitioner and to emphasize a few truths which may be of practical benefit to him in his daily routine labors. The almost forgotten knowledge of surgical conditions relative to the oral cavity, which the general dental practitioner possesses to-day, is

the result of abstract consideration of the subject while in college and an irrelevant application of the same since leaving his Alma Mater. He stands in a position similar to the early mariner whose area of action was confined to the outline of the horizon, with the land always at one edge of his field of vision.

After ten years of active dental practice, from personal experience, and by close association with students and graduates, I feel quite safe in making the statement that surgical conditions of the mouth are but little understood, beyond the treatment of alveolar abscess, and the extraction of teeth. The subject, as it is pursued in the colleges, is but too often viewed by the student as useless material and gladly abandoned immediately upon graduation and, instead of developing and widening our scope of action, we straightway begin to concentrate our work along the old, familiar and well trodden paths of our predecessors. It is not my object to infer that we should usurp the rights of the laryngologist, rhinologist, or the otologist, but I do claim that these conditions should be thoroughly studied and understood by the dentist, as one field so overlaps the other that it is difficult at times to clearly detect the line of demarcation.

The colleges throughout the country are rapidly installing chairs of oral surgery where none have previously existed, and in those institutions where this subject formed part of the curriculum, more time and energy is being devoted to its development. The tendency of the profession at the present time is one of marked progression. Already the medical branch is making overtures to the dentists, and endeavoring to cultivate a closer acquaintance. In nearly all the large hospitals in Philadelphia and New York (and I think this is true in other communities as well), their catalogues state they have either resident or visiting dentists.

The municipal authorities are also rapidly awakening to the fact that the teeth constitute an important integral part of the human economy and that the proper care of the oral cavity exerts a marked influence on the present and future health of the individual. Hence the establishment and maintenance of public dental dispensaries.

Turning rather abruptly from the opening remarks, we shall make an effort to confine our thoughts to the subject of the evening, viz.: "Conditions Simulating Alveolar Abscess." It is rather an unfortunate title, as growths which may be mistaken for alveolar abscess are so numerous that it would be confusing to attempt to outline them all, and the folly would be still greater were we to make an effort towards a differential diagnosis. We shall therefore, in a brief manner, call attention to a few pathological entities of the face and neck and endeavor to enlarge on one which has proven itself of much interest and which is of greater frequency than was once supposed.

Adenitis.

Among a few growths of the neck of importance, from a diagnostic standpoint, is first, acute cervical adenitis. This condition occurs chiefly in children and frequently follows infections from the teeth, mouth, gums and tonsils. If the condition develops into a chronic hyperplastic enlargement of the lymph nodes, with a tendency to spread to adjacent glands, and the skin becomes adherent, a probable diagnosis of tubercular origin may be risked. Inasmuch as tubercular cervical adenitis usually occurs during the period of exfoliation of the deciduous and the eruption of the permanent teeth, the condition presents many confusing features. It sometimes becomes necessary to expose and remove one or more affected glands before a positive answer can be given.

Actinomycosis.

Actinomycosis, especially in its early stage, may strongly resemble an abscess. The disease usually gains access to the tissues through a carious tooth, in which raw grain or corn containing the fungus, has found lodgement. As the process develops, the characteristic, indurated, elevated and cord-like appearance along the line of the jaws on the side containing the carious tooth, becomes manifested. It is at this stage that doubt may arise regarding its character. Later there is a discharge of pus through the various sinuses of the face, which has a peculiar earthy odor, and contains minute granules. These features, together with the detection of the Ray-fungus by the microscope, determine the diagnosis.

Among the conditions which are worthy of mention are Hodgkin's disease: neoplasms, especially osteomos, osteo-sarcomas, carcinomas, the various forms of odontomas, cystomas, fibromas, harmatomas and aneurisms.

Ludwig's Angina.

The disease to which I particularly wish to refer is that known as Ludwig's angina. As this affection is, in the great majority of cases, directly traceable to some pathological condition of a tooth, it might be well to briefly consider the anatomy of this region.

In a general way we are familiar with the complexity of the structures entering into the formation of the mouth and neck; the intimate relationship existing between them, the intertwining of the nerves, the ramifying and tortuous paths of the vessels; the overlapping and interlocking of the muscular fibres and especially the wealth of glands and lymphatics. It is these channels of absorption with which we are principally concerned in studying the conveying of infection. Those most directly involved are the two great cervical nodes. The neck glands may be likened to a collar or circle surrounding the top of the neck from which is suspended a vertical chain on each side under the sterno-mastoid to

the chest. These are flanked by several accessory chains. The collar is composed of the occipital group: the mastoid, the parotid, the sub-maxillary and the sub-mental. The parotids lie adjacent to and within the substance of the parotid salivary gland. They drain the meatus, tympanum, and part of the cheek and temporal region; also the nasal-fossa, lateral pharynx and eustachian tube. These chains frequently give rise to deep pharyngeal abscesses. The sub-maxillary glands traverse the region of the lower jaw, and drain the nose, gums and parts of the tongue. These are of great surgical importance because infections from tumors and abscess of teeth are absorbed by them. In intimate relationship with these structures are the two maxillæ, containing the various teeth, the roots of which are closely encompassed by the medullary portion of the bone, which consists of sponge-like or cancellated structure, and which intercommunicate or are imperfectly divided by this thin septa of osseous material. The largest glands in greatest proximity are the sub-lingual, the sub-maxillary and parotid. You can now readily comprehend with what freedom infections passing through or arising in the teeth can readily gain access to these very important locations, and how a simple abscess by pressure necrosis may infiltrate the surrounding integuments and speedily bring about a fatal termination.

The mouth when the teeth are in occlusion may be likened to a box which is bounded on all sides except posteriorly. The sides are bounded by the teeth and jaws, the superior boundary being formed by the roof of the mouth, while the inferior boundary or floor is completed by the union of the mylo-hyoid muscles.

When the mouth is closed and the tongue is in its normal position all space is occupied. The deep cervical fascia in the sub-maxillary region is dense and resistent, and the sub-maxillary salivary and lymphatic glands are enclosed in a facial space. This sub-maxillary fossa communicates by means of loose cellular tissue and blood vessels with the deep retro-maxillary fossa, so that a cellulitis beginning in one of these spaces readily extends to the other through this communicating passage. The dangerous symptoms of dyspnea and dysphagia in Ludwig's angina are caused by the extension of the inflammation through the wall of the pharynx to the pharynx and larynx from the retro-maxillary fossa.

With this cursory anatomical review, we can clearly see how tissues which are already closely coaptated and which encompass such vital structures may, under a rapidly spreading and virulent infection, cause the most pronounced symptoms.

Ludwig's angina was first described by Ludwig in 1836. For years much discussion arose in regard to this condition being a new pathological entity. Foremost among the antagonists to this theory was Delorme,

who considered that Ludwig's angina was nothing more than a sub-lingual phlegmon. However, on account of its anatomical seat and similar constant symptoms, he was inclined to view it as a morbid entity, and since then the name of Ludwig's angina has been retained. There seems to be but little doubt that the nature of the bacillus and its site of entrance has much to do with the symptoms following. As an example, with the infection of the cellular tissues of the neck when there is room for inflammatory swellings, the pain and progress of the angina will be far less and slower than it would be where the infection has passed directly through the medullary canal of the mandible from the tooth and lodged within the capsule of the sub-maxillary gland, where all the tissues are tense.

As most fatal cases are due to a constriction and subsequent edema of the glottis, we can at once see that sudden death is due more to the anatomical formation of the parts than from infection, as similar infection in other parts of the body gives a much smaller mortality.

As a large percentage of this condition, which has a mortality of over fifty per cent., is due to infections through teeth, it at once becomes of interest to the dentist. As has been mentioned, the cause of Ludwig's angina is sepsis. The bacteria which are most commonly found are the staphylococcus, streptococcus, diplococcus and pneumococcus. The principal offender is the streptococcus, which is usually found mixed with some of the other variety.

Diagnostic Symptoms of Angina.

When the teeth are the starting point, the inflammation involves the periosteum of the lower jaw and thence all the surrounding tissues. No matter how it commences, it spreads along the connective tissue by direct continuity. In these cases it is not transmitted by lymphatics. The lymphatic glands do not become enlarged by infection carried to them through the lymph stream from the infected focus, but they are involved by the connective tissue surrounding them.

The disease is characterized by febrile disturbances, chills, and high fevers, which are soon followed by difficulty in mastication and deglutition, and this may suddenly occur in an otherwise healthy individual. In the region of the sub-maxillary gland a hard, indurated and sensitive tumor makes its appearance, which cannot be definitely outlined as in a more superficial glandular involvement. There is an infiltration of the connective tissue, which surrounds the muscles of the neck, and to the alveolar lingual sulcus, the soft palate and the pharynx. Marked redness of the skin does not manifest itself at first, but later, where the swelling has invaded the cellular tissues of the whole of the affected side, the neck

is distended, hot, red, and inflamed, which conveys a boggy sensation to the palpitating fingers and readily pits on pressure. In the anatomical description, we spoke of the tongue completely filling the entire oral cavity, and now that the sub-lingual cellular tissues become engorged, the tongue is of necessity forced upward, causing the mouth to open and the tip of the tongue to protrude. There is more or less ankylosis of the jaws, and the partially open mouth allows a free escape of saliva, which is of a foul odor. If this condition is not relieved, spontaneously or surgically, the pressure symptoms become more pronounced, the tongue presses backward and downward against the glottis, causing constriction, edema, and death.

Two of the features which are usually constant in the condition are the woodlike hardness of the floor of the mouth and the marked dyspnea.

Of 106 cases reported by Thomas, the primary focus of infection, dental caries was noted in 36 cases, the third molar being involved in four. So far as reference to special teeth is concerned, they were always molar, usually the third lower, those nearest to the sub-maxillary region.

Probably the best illustration I can give you will be the records of a few cases.

Records of Cases.

First, a case reported by Berman. A woman, 18 years of age, habitual good health, complained of bad second left molar on August 26. August 27, on same side, appeared a hard, parotid swelling, an alveolodental periostitis, opposite the carious tooth. August 28, abscess opened itself on external side of diseased tooth and discharged a mass of fœtid pus. External swelling does not diminish, and it is extremely hard. Sub-lingual swelling forms a hard ring around the tongue, which is pushed up against the roof of the mouth. Voice harsh and muffled. Considerable dyspnea. August 29, spontaneous opening under the tongue with escape of fœtid pus mixed with blood. Deglutition and respiration very troublesome. August 30th, bad night, delirium. Considerable dyspnea. Swelling invades greater part of thorax. August 31, prostration increases, extreme dyspnea; deglutition impossible. September 14, stupor develops, finally coma and death. Autopsy, 36 hours after death. Complete mortification of muscles from chin to sternum. Impossible to recognize their structure. Voluminous cellular debris and a considerable mass of fœtid pus. Epiglottis destroyed. Mucous membrane of larynx and trachea swollen and covered by viscid mucous. Mucous membrane of pharynx and esophagus is blackish in color. On internal surface of inferior maxilla is a fistula communicating with the gangrenous focus.

Case 2.

Michel. Man, 38 years. Admitted to hospital December 2, and dies same day. Vigorous health.

Duration of disease, four days. Suprahyoid, median and lateral swelling as high as ear, more marked on right side. No fluctuation. Contriction of jaws; swelling of buccal floor; marked dysphagea. Dyspnea also marked, but no threatening of suffocation. Abundant flow saliva; speech embarrassed; temperature at 4 P. M. 102°. Origin in carious tooth, causing a sub-maxillary swelling, which rapidly increased. At 6 P. M. median suprahyoid incision, only blood escaping. Patient seemed slightly relieved, but at 11 P. M. he died suddenly of suffocation. Post mortem showed edema of glottis.

Case 3. Keim. Man 26 years. December 29th, at 9 P. M., patient arrived at hospital, nearly asphyxiated. It was necessary to carry him; the swelling began on the 26th at the same time as an inflammation about a carious tooth. December 28, dysphagia developed and already dyspnea was present. Patient continued nevertheless to work. Respiration became more and more difficult. On admission, 29th, there was considerable suprahyoid, hard swelling predominating on the left side. No fluctuation. Floor of mouth slightly elevated and tongue swollen; mouth full of mucous. Pulse 152. Sub-maxillary incision made 6 cm. long, great quantity of fœtid pus escaped with blood; while on operating table respiration became more difficult and stopped. Tracheotomy and artificial respiration revived him. December 30, right side of neck is more swollen, and is enormous. Temperature 102°. Pulse 140. Patient calm and swallows liquids. December 31, incision posterior to angle of jaw on left side. No pus, only blood. Temperature 102°. Pulse 161. General condition worse. From first incision bloody serum and bubbles of gas can be expressed. January 1, swelling invades base of neck and thorax, where crepitation can be felt. January 4, incision in right side of neck, evacuates some drops of pus with blood and gas. Death at 7 P. M., with intense dyspnea. Face cyanosed. Tracheotomy tube is always in place, and working well.

Autopsy. The whole floor of mouth, especially at the angle of the jaw, was transformed into a gangrenous mass. The parotid glands were in full suppuration. Epiglottis was edematous.

These are but a few of hundreds of similar cases which might be recorded, but doubtless the three we have selected will be of sufficient force to impress upon you the gravity of this condition. The many other cases, where the teeth are not suspected, may nevertheless be caused by them, as the majority of the patients thus affected quickly fall into the hands of physicians, whose ability for diagnosing devitalized or abscessed teeth is frequently limited. How often we have seen perfectly innocent

looking teeth, whose color is comparatively normal, showing but slight decay, which when put to the test are found to be irritating factors. And so it is with Ludwig's angina, that a very much higher percentage might be attributed to the teeth if they first came under the observation of the dentist, or the dentist was called as a consultant. The rapidity of the disease undoubtedly depends on the primary site of infection. If the sub-maxillary is early diseased, and the inflammation advances beneath the tongue, and also posteriorly toward the pharynx, where the structures are tense and do not expand, edema of the epiglottis follows at once, and death soon results. However, if the inflammatory process finds its way beyond the angle of the jaw into the deep cellular tissues of the neck, the prognosis is somewhat brighter, as these vital centers are affected secondarily when the process is delayed.

Diagnosis.

There is not much to be said of diagnosis. The features of the disease are so rapid in their development that the condition is usually self-evident when the case reaches you. The history of a carious or abscessed tooth, or molars about which an area of inflammation has developed, or an unerupted third molar, which may have become cystic, should excite suspicion. Other prominent and usually constant symptoms are the wood-like sensation to the finger in the floor of the mouth, partial ankylosis, difficult deglutition, dyspnea, cyanosis, with interference of speech, and excessive flow of saliva; these are all signs which should aid greatly in reaching the diagnosis.

Prognosis.

Prognosis is influenced by the nature of the infection, and the direction and rapidity of its spreading. The streptococcus, with a mixed infection, probably constitutes the most virulent form. Those cases starting as a true angina, which exhibit but little pus, are far more fatal than those which start as a sub-maxillary cellulitis with pus, and later point toward the larynx and become a true Ludwig's. The results are also greatly influenced by the early recognition of the condition and the completeness of the operation. However, any condition which gives a mortality of 50 per cent. is always to be considered with much gravity.

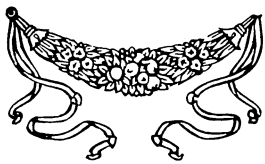
Treatment.

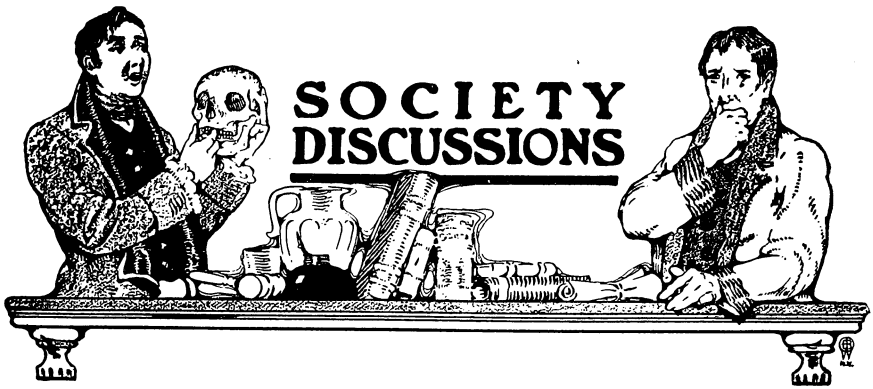
Little emphasis should be put on palliative treatment in these affections, as their efficacy is of doubtful value, and much precious time may be lost. The important object is to immediately evacuate the pus, no matter how scanty the quantity may appear. The successful results are accomplished where treatment is instituted early. If possible, instant attention should be given to the offending tooth if the disease arises from that source, and either proper drainage must be had or the tooth removed. If the anky-

losis is too pronounced, and the jaw cannot be separated sufficiently, then by the use of a curved bistuory an incision may be made, from within the mouth down to the seat of the abscess, depending upon whether or not it is the sub-lingual or sub-maxillary glands.

Drainage from within the mouth, however, has not proven very satisfactory, and the external route is the one usually adopted. An incision is made just over the sub-maxillary gland and parallel with the mandible, which is continued to about the hyoid bone. Slow and careful dissection is now necessary, as all the anatomical landmarks have been glued together and obliterated by the inflammatory process. Should only blood or serum and no pus be found, the absence of pus only proves that the suppurative stage has been forestalled by the operation. It may be positively assumed that nearly all swellings of this character are of pyogenic infection. The streptococcus is so rapid in its dissemination that very little or no pus is discovered unless it has become a mixed infection. It is astonishing how promptly all symptoms will subside when a good, free drainage has been accomplished.

The principal points to be remembered are that Ludwig's angina usually arises from a carious tooth in the lower jaw, most frequently one of the molars. That it secondarily affects either the sub-lingual or sub-maxillary salivary glands. That an early board-like condition of the tissues occurs in the floor of the mouth. That the principal and most dangerous infection is by the streptococcus bacilli. That it is a disease of a few hours' or days' duration, with a mortality of 50 per cent., and usually kills by edema of glottis. That early recognition of the condition, with an early incision and complete drainage, is imperative.





Second District Dental Society.

December Meeting.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, December 12th, 1911, at Delmonico's, Fifth Avenue and 44th Street, New York City.

The meeting was preceded by a dinner, given in honor of Dr. Wm. Taggart, of Chicago. Invitations to participate in the evening's entertainment had been issued to a number of the neighboring societies and three hundred and twenty-five dentists were present.

The President, Dr. Ottolengui, occupied the chair and called the meeting to order after the dinner, during which a number of enjoyable vaudeville feaures had been introduced. President Ottolengui introduced the guest of honor, Dr. Taggart, who read a paper entitled, "The Scientific Casting of Gold."

Discussion of Dr. Taggart's Paper.

President Ottolengui. Acting as host, I am very much tempted to invite one of our guests to open this discussion, but for sentimental reasons I am not going to do it. When I was out at Ann Arbor this summer Dr. Hoff asked me if I ever noticed that in Illinois they never have anybody on their programme except Illinois men. They do not need to go to New York for essayists—or anywhere else. They have trained men in Illinois to write papers, and they have succeeded so well that the New York men must go to Illinois to get their papers.

We have a man in Brooklyn—one of the most ardent disciples of Dr. Taggart, a man who has industriously experimented to get the best results from his process. I will ask our own Dr. Van Woert to open this discussion.

Dr. F. C. Van Woert, Brooklyn.

I assure you this is very unexpected. I had not the faintest idea that I would be called on for any part in this discussion, to say nothing of opening it.

I go back to the very beginning, the conception of the casting of gold, by this wizard of the dental profession. You know what is said of Thomas A. Edison, that he is the wizard of Menlo Park—the wizard of electricity. Taggart is the wizard of the dental profession throughout the entire world.

I remember distinctly the first details that he demonstrated to myself and some friends, of this wonderful method in the restoration of lost tissue in the teeth; and I cannot help but feel, notwithstanding what he has shown you this evening, that the original method that he demonstrated to us on that occasion was just as wonderful as these new appliances seem to you to-night.

I think I stand practically alone in Greater New York to-day as an exponent of the principles of the man who has addressed you this evening. I do not think there is another man in the room, and I have been censured for saying this, who has imbibed so much from this man, and who has followed so absolutely his teachings, as I have. When Dr. Jenkins, of Dresden, first brought out his porcelain fillings, and abandoned all other methods for it, so to speak, I thought he was one of the most courageous men I had ever heard of. I did not suppose a man could practise dentistry and take so radical a stand as he did. At the same time, I was ready and willing, if possible, to accept his teaching and follow him; but, gentlemen, I could not do it. There was something lacking in the technique that prohibited my absolute acceptance of his standards. Notwithstanding this, I felt distinctly that there was more in the cemented filling than in anything that has ever come to the dental profession, in my experience.

An occasion came by which I was compelled to protect myself with a patient, and I went to Chicago to see Dr. Taggart and, if possible, get from him, as I thought at that time, a solution to my difficulty. I went; I obtained it, and from that time to the present moment I never have put in a gold foil filling. Some of you have censured me for this, and may do so again.

At that time I accepted the cemented filling as the filling *par excellence* for tooth salvation. Up to the time when Dr. Taggart came to New York and introduced the cast gold filling there was nothing in this world which appealed to me so strongly as the porcelain filling, as advocated by Dr. Jenkins. I admit there were many cases where I would have liked something different from porcelain, and not an amalgam, but

I would not go back to the gold foil filling. The solution came in the cast gold filling by Dr. Taggart, and now I do not want anything better under God's heaven than a cemented filling to save a tooth.

In all my experience as a dentist, spent among you Second District men whom I have known for thirty-odd years—men whom I love and adore—I have never known in all that time anything to come to the dental profession that has been such a boon to us, such a Godsend to the world as the cast gold filling.

The porcelain filling is one of the things that is a necessity, and I want to say to you men who are using the silicate cements and making yourselves believe that you are doing something that is as good as the porcelain, that some day there will come down on you the greatest avalanche of failures you ever saw. Silicate cements are good for temporary places. Oxyphosphate has its place and amalgam has its place, although there is nothing that has been abused so thoroughly as amalgam. On the other hand, I will never put in another gold foil filling if I live to be fifty years older, because there is no necessity for it. We have a method by which we can save teeth better than we ever could with foil. Gold foil was the foundation upon which the profession in America built up its reputation. The best gold foil workers were found in this country, and there was no more ardent admirer of them than I. But they have outlived their time. Things have moved on, and we must adapt ourselves to the times.

President Ottolengui.

I am now going to call upon the only man ever elected to the presidency of the National Dental Association unanimously on the first ballot, Dr. Gaylord, of New Haven, Conn.

Dr. E. S. Gaylord, New Haven.

If I made a confession to you at this moment it would be this, that I am absolutely incapable of expressing my feelings toward this good brother—absolutely incapable of expressing in the slightest degree the great value his work has been to me in the feeble efforts I have been able to bestow upon that work, and the great satisfaction, and I hope advantage, in following the methods he has given us to perfect the work I have attempted for my patients. You all know I am not given to making long—or short—speeches; but I am pleased to get on my feet and express my feelings of gratitude toward Dr. Taggart for coming once again to us. Four years have elapsed since his presence here. Already it has been mentioned what he brought to us then. To-day he comes laden with more treasures, and what may be done four years from now no one can conjecture. But it is my earnest hope—and from the expression of the faces I see before me I know I express your

feelings—it is our general hope that you, Dr. Taggart, do not stay away from us for years, but come to us every year; and here is the evidence of the feeling, that, come as often as you will, you will always see these bright faces to welcome you, and in numbers far greater even than you have to-night.

I will not consume more time, when I see so many others so much better able to discuss the paper. I thank you for the privilege of being here, and I thank Dr. Taggart for the privilege of listening to that valuable paper and looking at his good, radiant face.

President Ottolengui. We have with us to-night perhaps one of the very first men to appreciate and make use of the casting process. He is a gentleman who really needs very little introduction in New York, or indeed, any part of the United States. I am very glad to ask Dr. Goslee, of Chicago, to address us.

Dr. Hart J. Goslee, Chicago. I am very happy indeed to have the privilege of being with you again, and I want to begin the few remarks I make on this occasion by expressing the fact that whilst I have oftentimes been embarrassed, no greater embarrassment has ever come to me than to be called upon to-night. At the same time I am free to confess that no greater honor has ever been conferred upon me. It was my privilege to come to New York with Dr. Taggart at the time when he first presented the principles of casting to the dental profession. It was my privilege to open the discussion on that paper. It is my privilege now to come with him for the third time, and my further privilege to be called upon to discuss this paper. You can, therefore, perhaps appreciate both my embarrassment and the honor, which I recognize. I wish it were possible for me to properly discuss this paper, but it is not. With you I am awed at the master work of this wizard, as has been demonstrated to-night.

Gentlemen, I have not been the most ardent supporter of Dr. Taggart, but thank God! I have been one of them. I only say this to you, that he has shown you upon each one of his three visits only the possibilities of what may be in this process. Recognize those possibilities and treat him right, and you do not know what might be in store for you.

President Ottolengui. Dr. Goslee has called our attention to the fact that Dr. Taggart has been to New York three times to address us on this subject and that he was with him each time. I hope these two men who bring us these wonderful messages and valuable discussions will realize that we like the habit which they have formed of coming to New York, and we want them to

believe they have no more loyal audience and no closer friends in the United States than right here.

Speaking of loyalty, at the time Dr. Taggart first came to New York—pardon my mentioning a little magazine I am connected with—we were publishing in ITEMS OF INTEREST a little series of articles on gold inlay work. On the day following Dr. Taggart's demonstration I wired to the gentleman who was writing this series: "Useless for you to write any more. All your work now goes into the waste-basket. We may as well melt up all the type held for your book!" He began to think, as I was his friend, that I must know what I was talking about, so he wired me: "Very well, melt that type." He is with us to-night, and has made the long railway trip just to attend this meeting. I call on Dr. Thomas Hinman, of Atlanta, Ga.

Dr. Thomas P. Hinman, Atlanta. It is certainly a great pleasure to be here to-night. It is a profit as well as a pleasure, and we have listened to a prophet. When I found Dr. Taggart was to be in New York I made up my mind that I would try to get here, because it is a great privilege to meet this most delightful gentleman and most wonderful dentist. For fifteen or eighteen months I did some hard work to get up some insignificant articles that were published, and it was a great pleasure that I could lay them at his feet.

I would like to say that it is my rule always, in coming to New York, to buy a return trip ticket, but to-night I feel I have been so benefited by what Dr. Taggart has told us, and I have seen so many wonderful things, that I feel like giving him my return ticket and walking home.

President Ottolengui. I see we have with us Dr. Frank Bliven, of Worcester, Mass. I want him to tell us whether this casting process has been heard of down East.

Dr. C. Frank Bliven, Worcester. I regret there are not here from New England silver-tongued orators like those who have spoken to you to-night, to express what some of us in New England would like to say. I am sorry that some unkind things have been said about Dr. Taggart up there, but there are a number of representative men throughout the New England States who have remained true, and who have recognized that since the time the rubber dam was first brought out as a contribution to the profession there has never been anything brought before it to equal in value what Dr. Taggart has presented to you this evening.

President Ottolengui. We have two men in our society, both of whom are ardent admirers of Dr. Taggart, who have worked hard for the success of this meeting, and I give them notice that I am going to ask them to turn the tide of the discussion now more into a scientific channel.

Dr. Charles F. Ash, New York. I think Dr. Ottolengui began at the wrong place to ask for a scientific discussion of this paper. I do not feel qualified to discuss it scientifically, but I feel very much as Dr. Ottolengui did, with all due respect to the previous speakers, that in their eagerness to express gratitude to Dr. Taggart they were neglecting the subject matter of the paper. A thought often comes to my mind in regard to the balls that appear on the bottom of inlays, and while the men were paying compliments to Dr. Taggart I kept thinking of those little balls—those little knobs—those little buttons. Only last Sunday I had occasion to cast four pieces—not inlays and not intended for dental work, but for a little gift which I intended to make to one of the members of my family. Those four pieces were almost identical, as nearly so as I could make them. They were made as carefully as they could be with the appliances which were in my laboratory, and the investment was mixed and the casting made, not by myself, but by a man who has been with me for thirteen years, and who has been deeply interested in Dr. Taggart's work from the time he first heard of it. Those investments, under my direction, were made up in separate mixes, and there were no two of those results exactly alike. I can, therefore, see the advantage of these new appliances which will make our various steps more exact.

We get fairly good results in our work in endeavoring to make inlays for the mouth, and they are good enough, so I joined the ranks with Dr. Van Woert some considerable time ago in putting aside altogether the gold foil filling.

I remember very well when the Jenkins inlay proposition was shown to the dental profession in Brooklyn for the first time. I had the pleasure of having the Second District meeting at my house on that evening, and it was preceded by a demonstration and a clinic in the afternoon by Mr. Leonard Jenkins. At the evening meeting there was a discussion as to the relative merits of the high and low fusing porcelain, and Dr. Van Woert was scheduled on that evening to take up the side of the high fusing porcelain. He had not yet been converted to the Jenkins porcelain. From that time I have made many inlays, but until the advent of the Taggart gold inlay I never have made an inlay for an approximal-occlusal cavity in a bicuspid which I felt sure would stay

where I put it, and that five, eight, ten or twenty years later the margins would be as good as the day they were made. But since I have been making the Taggart inlay I have arrived at the point where I know that the inlays are worth the money my patients have been paying for them. I follow as carefully as possible the instructions Dr. Taggart gave me. I had the immense privilege not only of hearing his paper, but being perhaps more closely associated with him, and I was able to procure from him some little points that cropped up from time to time in the technique of the work; but in spite of all my attempts to follow the technique I failed time and time again to come up to the requirements I felt Dr. Taggart would demand. It was practice—keeping in mind all the time the specific directions of Dr. Taggart—that brought better results; but I have never been fully satisfied that every time we attempt to make an inlay we will get exactly the results we aim at; and sometimes it is necessary to make two inlays.

I believe the most important thing, perhaps, Dr. Taggart has given us to-night, if one thing can stand out as more important than another, is the device for keeping the wax at the proper temperature. I have heard so many people say, "In using the wax I find after withdrawing it from the prepared cavity, whether in a die or in the mouth, the wax does not go down to the bottom of the cavity." I have seen some men melt it to get it down into the cavity. Hardly any one of us can be sure that we get the wax down into the bottom of the cavity every time, and if you do not get it there every time you do not get the full value of the retention of that cavity.

I want to pay my tribute to Dr. Taggart and thank him. Words are almost inadequate with which to try to thank him, but I want to say that we all know Dr. Taggart was disappointed in finding that members of the profession were not satisfied to wait for his device, but had gone ahead with all kinds of imitation machines, and it was inevitable that he should feel that there was some opposition to him among the members of the profession. I want to assure Dr. Taggart, and I am sure I am voicing the opinion of every man in this room and of many more, when I say that among the loyal friends he has all over the United States and in the remote parts of the earth he has no more loyal ones than right here in the City of New York and its vicinity.

President Ottolengui. Dr. Ash spoke of the difficulty of forcing a piece of wax absolutely to the bottom of the cavity. I wish every one could hold in his hand a piece of wax that had been—"annealed," I will say, in this electric "annealer." He showed me when I was in Chicago a piece of wax that had been in

the annealer for twenty-eight hours. I think the best way I could convey to you the condition of that wax is to say that it was soft enough to be pressed to the bottom, and resistant enough to allow you to press it to the bottom. I hope we will all soon be able to use his wax, annealed in his annealer. I see before me a gentleman who has in one sense one of the same characteristics Dr. Taggart has, and that is the willingness to take infinite pains, as has been demonstrated by work he has shown before the Second District; and I will ask Dr. Tompkins, of Utica, to speak to you.

Dr. Henry H. Tompkins, Utica.

If anyone ever was embarrassed, I certainly am that individual to-night. However, I cannot let this opportunity go by without at least expressing my appreciation of this wonderful work, and the inventor of it. Most of us are simply followers, and we are delighted to listen to those who have had experiences and have learned something.

I thank you for this opportunity to express my appreciation.

President Ottolengui.

I know of no gentleman in the Second District, outside of Dr. Van Woert and Dr. Ash, who has been a more ardent admirer of Dr. Taggart than Dr. Nies, of Brooklyn, and I will next call upon him.

Dr. F. H. Nies.

We are all grateful for being here to-night and we all owe a great deal to Dr. Taggart for these visits. There is nothing so conducive to good work as positive measurements, whether used in measuring and weighing the ingredients of an investment formula or in regulating the degree of heat needed to properly soften inlay wax, or in heating an investment. There are castings and castings; the best are those made with the Taggart machine. Unfortunately, I could not always get results. I was told I made my mistake in the handling of the flask and in the heating of it. I found that by heating the flask too hot I lost my casting through negative pressure (the investment shrinking and the metal ring expanding permitted the pressure to escape between the ring and investment), and by heating the flask insufficiently I lost the casting by not making the investment porous enough to permit the dissipation of air through the investment. And at times castings were lost through the presence of steam in the mould formed by casting hot metal into a cold mould. The steam formed as the molten metal is shot into a mould that is insufficiently heated often causes the separation of the casting and sprue. These failures were remedied by heating the investment in a tapered flask which I invented and gave to the profession in 1908. I differ with the Doctor in regard to the "cold mould," which is in reality a mould

first made porous by heat and then allowing the metal ring to contract and tighten about the investment in cooling, thus in a measure preventing the escape of pressure. I cannot heat them hot enough; but I use with the Taggart machine a tapered flask, which takes up shrinkage as the investment is forced down by pressure and prevents the escape of pressure gases between the investment and the flask.

Dr. Price's stone model method tables on the contraction and expansion of metals and investments is, I surmise, what Dr. Taggart alluded to when questioning the value of elaborate scientific laboratory tests as against clinical experience. These tables of Dr. Price's are very valuable and will eventually be used by all.

Dr. Taggart spoke of casting clasps. This will never be successful with the present formula for clasp metal. The spring in a clasp comes largely from the molecular arrangement of its molecules due to passing the clasp metal between heavy rollers, thereby causing a flattening of the molecules in the clasp metal. By hammering we get the same result. This is seen in the spring of wire. No casting can ever have this spring. The casting of full gold plates will never be successful with our present alloys. If cast in any other metal than 24 karat they crack and break. If you make them of 24 karat, heavy enough to counteract their softness, they are too heavy for comfort, and if too thin, are so soft that they bend. They lack the spring that rolled plate gold has and that swaging gives.

President Ottolengui. We have with us to-night a gentleman from Philadelphia who has devoted considerable study to the casting problems. We will now hear from Dr. Lane.

Dr. J. G. Lane, Philadelphia. It has been a great pleasure to me to hear what Dr. Taggart has had to say on the subject of standardizing the operation of dental casting, and the technique as a whole, with the ultimate idea of having a standard product, and success. As we look over the dental journals we find one man says "Tweedledee" and the other "Tweedledum," and unless one does a lot of experimenting himself he is at a loss to know which technique to follow, they are so radically different. It is a great pleasure to see some effort being made at standardizing the technique, and Dr. Taggart certainly has shown us that to-night.

I am to read a paper to-morrow evening before the Pennsylvania Association of Dental Surgeons on the subject of casting. In it I try to compare the different opinions and technique, and draw such logical conclusions as may seem most plausible.

There is one point that I would like to touch upon, and that is in

regard to the shrinkage of the metal after it has been cast, and while it is cooling. That is a problem which seems to be baffling a good many in their work. That little shrinkage which occurs has been the cause of many inlays failing to fit the cavities. I would like to hear what Dr. Taggart might have to say on shrinkage.

I have noticed that a number of men this evening have referred to the investment material burning smaller. The last speaker referred to the fact that he is using a tapered flask in order that he may not have a space present between the flask and the investment when heated. It seems to me it must be radically wrong that an investment should be so compounded. It should not require a tapered flask in order that the investment may drop farther down, and thus have a correct fit. A properly compounded investment will expand as much as the brass flask which contains it when both are heated to redness.

One of the gentlemen also referred to hot flasks. I have always advocated that a flask should be hot—red-hot—at the moment of casting. A very hot investment is vastly stronger and more resistant to the abuse that must be brought to bear upon it than a cold one. This can easily be proven by heating the investment material hot enough to remove the wax and carbon, allowing it to cool down, and afterward knocking it to pieces. Then for comparison knock a red hot investment to pieces and note the difference in their integrity. It will be found that an exceedingly hot investment is far more resistant than a cool one. Dr. Taggart referred to the expanded flask. A hot flask is an expanded one. I do not know whether he meant this as I interpreted it, but I inferred that he meant an expanded mould may not be expanded equally in all directions. Dr. Taggart told us that a casting made in a hot mould would not fit the cavity, but did not tell us wherein or why it would not fit. The extra degree of expansion in a red-hot flask is not quite sufficient to neutralize the shrinkage of the gold that will occur in cooling.

I find the best result I can get with ordinary technique, a good investment and a very hot flask is a loss of 1/6 of 1 per cent. With the same conditions, except that the flask has been allowed to cool, I get a loss of .88 of 1 per cent. This in compound step cavities causes a very decided misfit.

Much has been said this evening in commendation of Dr. Taggart and the work he has done. It would be useless for me to try to add anything further. I admire the new innovation as much as anyone and have used it very largely, although not exclusively. I believe there is no one thing in dentistry, during my experience at least, that has become anywhere nearly so universal as the method Dr. Taggart has given us. I sincerely hope he will go ahead and standardize it for us, in the way it ought to be done.

President Ottolengui. I will now call on a gentleman who is a very ardent admirer of Dr. Taggart. We will hear from Dr. Chayes.

Dr. Herman E. S. Chayes, New York. If you will permit me to preface what I hope shall prove a scientific discussion of a scientific paper, I want to say to Dr. Taggart *veni, vidi, vici* —he came, he saw, he conquered. I have been to the clinic, I have heard the paper and I have heard the discussion, and I say this with as much pride and with as much sincerity in the pleasure I have experienced as the Mohammedan when he can truthfully say, "I have been to Mecca"; for, gentlemen, I have been to Mecca.

When I first met Dr. Taggart at a table clinic in Jamestown he was kind enough to notice some little effort on my part in prosthetic dentistry and to compliment me on a certain piece of work I showed. I do not know whether it was the peculiar psychology of the man—whether there was a telepathic union between our minds—but it is true I have been prostrated at Dr. Taggart's feet ever since. He never knew how much I admire him, nor how closely I follow his methods, nor how much I care about the process and what it meant to me; but I wanted him to know and I wanted him to feel that he had taken one man who had realized his inability to practice dentistry heretofore and made it possible for him to stand up before an audience such as this to-night and say, "I know what I am doing when I cast. When I use his machine and his process I know I will get the results I expect."

I was willing to take what the master had given me, and not distort it, until I had arrived at a point where I could master his technique, and I have done so. I know that it is a well-established fact that it is safer, saner and more just to your patients to practice the Taggart inlay method of filling teeth than to use gold foil, and, like Dr. Van Woert, I have not put in a gold foil filling since Taggart brought this process into the world, or rather, since I heard about it.

I want to call your attention to a field for the Taggart process and the Taggart machine, and I want to preface my statement by saying that never before in the history of dentistry has proper crown and bridge work been practiced until Dr. Taggart brought forth his process and his machine. Regardless of any master mechanic who may be present, regardless of the years one may have expended in the use of blow-pipe work, the physiological relation of the artificial fixture to the tissues of the mouth was never made perfect until Taggart came forth with his process and his machine. It was a physical impossibility, and always will be, to accomplish with the blow-pipe what can be accomplished with this process.

And now as regards the scientific casting of gold: I did not encounter such tremendous difficulty in the casting of inlays until I traveled from the inlay to larger pieces, and I think I failed there because it had been impossible for me to obtain the technique of these larger pieces directly from Dr. Taggart. I found, to begin with, that I could overcome a great many of the difficulties usually encountered in large pieces by doing away with the investment of my wax at right angles to the sprue wire. You must not overlook the point that when you attach your sprue wire to a saddle piece or a plate at right angles, or in an exactly upright position, you are forcing your molten gold into all the radii of a circle and your casting will be successful inversely to the undulation or torsion and the ratio to which you force that metal; the greater the obtuse angle at which your wire stands to your piece the greater your success in forcing the metal down, because you have every natural physical aid to help you.

I do not know whether Dr. Taggart has been doing extensive crown and bridge work with his machine, but to me that has been one of the fascinating fields for its use, and I find that in casting my crowns and sections of bridgework it is essential to get my flask into a heat great enough to get the platinum hood into a molecularly receptive condition. Platinum is a very obstinate metal to work with, and unless you get platinum hot enough so that you get a certain amount of molecular space—this may be imaginary—you will get a very imperfect union between your gold and your platinum, and in cast crowns I have found it absolutely essential to use a platinum hood. Getting my flask very hot and using a platinum hood, it may sound as though I disagree with Dr. Taggart, but I do not. No more hot flasks for me to-morrow. It shall be a cold flask for inlay work if he directs me to use a cold one, providing, however, he sends me his investment material—his wax, his annealer and his mixer. (Applause.)

Another point: I have not been able to follow him in the use of coin gold because of my almost fanatical adherence to the rule that there is no metal royal enough for the human mouth; and since I have entirely discarded the use of any kind of solder in my laboratory I find it impossible to join my various sections of coin gold with pure gold, because the pure gold fuses at a higher point.

The choice of metal for an inlay, I think, must depend on the likelihood of stress on that inlay, and two conditions may be present: one when the inlay comes in contact with an artificial tooth occlusally; another when the inlay is to be used as an abutment for a bridge, when the lateral strain becomes greater because of the movement of the jaw. I found that where the inlay was to stand by itself that the tendency of the

pure gold to spread if there was any great masticatory stress, particularly in the neighborhood of the first permanent molar, made it advisable to platinize the gold in order to obtain a greater hardness. That, too, is open to correction from Dr. Taggart. When the inlay is to be used as an abutment for a bridge distally (particularly in the upper jaw—because there we have a mobility which accentuates the stress, while in the lower the stress is more or less taken up by the movement of the mandible at the joint) it was necessary sometimes to allow the gold to an extent of 10 to 12 per cent. with platinum. Dr. Taggart will understand that I do not say this in a spirit of criticism, but as open to correction from him.

I wonder as I stand here how long we will have to wait for Dr. Taggart to give us these instruments. These instruments can absolutely not be discussed. They are perfect in their workmanship. They have been conceived by a master mind that knows no limitations. But I cannot help remarking that it is a sad commentary upon the intelligence of the dental profession that although they are willing to accept all that this master mind has devised and given them, they are willing to accept them from him only as an offering upon the altar of his profession. Thus there have been numerous spurious, worthless imitations of this machine—suckling, squealing pigs, and carousel toys; and we have seen the dental world scrambling for these cheaper makeshifts and experimenting with something that is sacred to it, or ought to be sacred, instead of getting the genuine, which is the only means of getting perfect, absolute and scientific results. The least we can do is to follow this technique and use his process. Do as he tells us, and do more justice to ourselves and to our patients.

Dr. M. L. Rhein.

The hour is too late for me to adequately express what I would like to say upon this historic occasion. I say historic because I believe it will take its place in the history of dental evolution as surely as the meeting at which Dr. Taggart gave us his first machine for casting purposes. It is a pleasure for me to feel that I can count myself among the loyal supporters of Dr. Taggart.

I have had the pleasure of being one of the few who, prior to this occasion, have had an insight into the treasures he has brought before you this evening, and the remarkable increase in their efficiency since I first saw them in his office in Chicago is an evidence of that untiring labor, night and day, which this man has given to perfect this process. We have listened to the well-merited praise bestowed upon the essayist for endeavoring to standardize this work. I would say that that is the one thing dentistry needs throughout its entire practice. It is the one

great criticism that can be made of our work at the present day in every field, and I only trust that the importance as evinced by the essayist in this particular line will leave its mark and imprint on the minds of the profession in many other departments of our work.

In spite of my deep affection for the essayist and my great admiration for everything he has done, I would not be myself if I agreed with Dr. Taggart in everything. (Laughter.) I have not laid aside my gold pluggers, and I do not expect ever to lay them aside. I use the Taggart casting machine and insert inlays almost every day, and frequently many of them in a day; but it does not preclude me from inserting what I choose to term a perfect gold filling, under proper circumstances, as a preferable form of procedure. I say this without withdrawing one jot of my loyalty and admiration for the essayist, and appreciation for what he has done for myself as well as everyone else. I say it as a protest against any such extreme doctrine as has been advocated by some in this discussion. I believe thoroughly that the man who feels he can best serve his patients by using gold inlays in every case is unquestionably justified in doing so, but it should not warrant him in saying that such a rule should be established for the profession generally, because when it comes to saving teeth by replacing lost substance it is the individual man who is best capable of judging what he can best do under certain circumstances for that tooth's preservation.

President Ottolengui. Whilst there are two hundred more gentlemen I would like to call on, I will now have to ask Dr. Taggart to close the discussion.

Dr. F. B. Leroy. May I ask the Doctor, approximately, what temperature does the wax assume under this instrument?

Dr. Taggart. The hour is too late to discuss or answer any special questions. In my experience with dentists I have always found, where there was a difference of opinion as to methods of casting they were talking of one thing and I of another. When I find men who do not get results and I ask them if they use my technique they invariably say yes. I begin to question them, and finally I trap those men into admitting they have never used one-quarter of my technique.

If you remember, in my first paper I alluded to the quality of the gold and advised you to be careful about using scrap gold, and if you did, and melted it into a larger button, I advised you to do it in a separate crucible—not the crucible made in the investment—and to use plenty of saltpetre and borax mixed in equal parts, and after refining in this way to dissolve off all borax with acid. In Chicago there is a man who

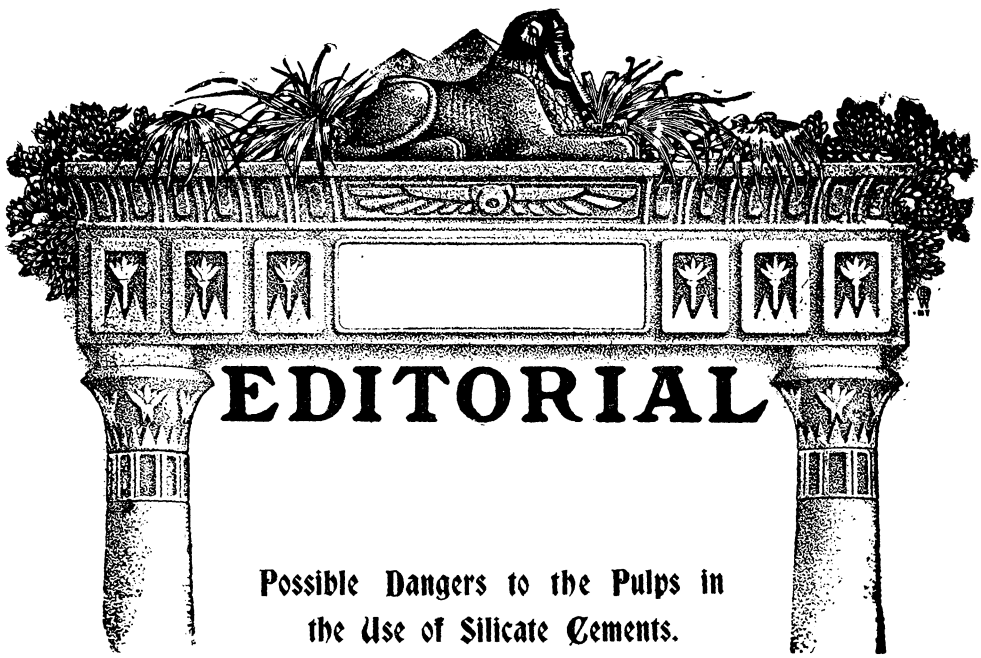
pestered and worried the dental depots there almost out of their quarters in his eagerness to say he could not get a casting with Taggart's machine. They, knowing I had enough of other troubles in trying to perfect the technique, kept this man away from me; but it finally became unbearable and I told them to send him to me. I tried to persuade him he had not used my technique. He said he had. Then I said: "Of course you know I have a nitrous oxide blowpipe on here. It is capable of burning out all the platinoid and the near-gold stuff that you put in the crucible, when you make your filling just take your scrap gold and put it right into the crucible, and this flame is so hot that it will melt all the base metals instantly and you will get some results that you possibly have not been getting."

He said: "Yes, I have been following that method exactly." (Laughter.) He brought me fillings that consisted of five or six little chunks of gold all in a rounded form. How did that happen? As soon as this intense nitrous oxide flame was put on, the smaller pieces were immediately melted into little balls and they rolled down the sprue hole until the hole was full. Then the larger mass melted, and he got nothing but a mass of little nodules in his mould.

I do not doubt your sincerity, but there seems to be a tendency in human minds to always object to anything they hear, especially if it is new to them. I do it myself. I immediately begin to see if I cannot improve on a man's idea. I feel, however, that down in the bottom of my heart, before I have any right to criticise any part of his product it is my duty to absolutely follow what that man has advised.

And that is why I asked you to-night in the beginning of my paper, "Have you heeded my message?" I thank you very much for the reception you have given me, and I hope to see you again.

Adjournment.



EDITORIAL

Possible Dangers to the Pulps in the Use of Silicate Cements.

Early in the year we received the manuscript copy of an article by Dr. Max Kulka, of Vienna, recounting his experimental researches in regard to silicate cements. This manuscript was sent to us for publication simultaneously with its appearance in Germany. A translation was made and the article put in type in time for our March issue, in which appeared an editorial allusion to it. Because of its length, however, and the prior claim of the papers of other writers, publication of the article itself was delayed until May.

The appearance of Dr. Kulka's paper abroad attracted a reply from Dr. Max Schreiber, of Berlin, which we have been requested to republish, and this we present in part in this issue, eliminating certain paragraphs critical of views attributed to Dr. Kulka, which must have occurred in previous articles by Dr. Kulka, since we cannot find foundation for them in the paper published by us.



Reasons for Publishing Dr. Kulka's Paper.

There is no doubt that the discovery of a perfect silicate cement would be a great boon for patients and dentists alike. The porcelain inlay, as made by the most skillful specialists with that material, is recognized to be the most desirable filling for cavities in conspicuous localities, but the highest results are only obtainable by very skilled experts, and such fillings naturally command fees which can be afforded by only a few. Porcelain, however, has won its way and the conspicuous gold filling in front teeth is no longer desired by people of refinement. Hence a filling material having the lustre of porcelain, which could be mixed as a cement and placed directly in a cavity at a single sitting, is a great *desideratum,* as affording an æsthetic filling at a comparatively low price. There are two qualities which such a material should possess before we can account the problem solved. First, it must be safe; that is to say, non-injurious. Second, it must be durable; that is to say, not easily fractured, nor readily discolored, nor dissolved by the fluids of the mouth. To one aspect of this problem Dr. Kulka's paper addresses itself, and in the opinion of the writer, Dr. Kulka appears to have conducted his tests in a thoroughly dispassionate manner. The fact that one cement would make a better showing than another was of course inevitable, and that Dr. Kulka should mention these cements by name was essential, for of what value to our readers would be his deductions if made in regard to unnamed products? Thus the paper was published not because it might benefit one cement manufacturer or injure another, but rather, regardless of such result. Nevertheless, it is always possible that any experimenter might make mistakes, and consequently we very willingly print Dr. Schreiber's reply.

We regret that the American agents for A. K. Z. (Ascher's Artificial Enamel) should have issued a pamphlet, quoting from Dr. Kulka's article in ITEMS OF INTEREST, mailing the same as an advertisement without our consent. By doing so they have rendered Dr. Kulka open to the accusation of having especially prepared his article in the interest of Ascher's Artificial Enamel, and ITEMS OF INTEREST to the suspicion of permitting its scientific pages to be utilized for trade purposes. We feel fully authorized, therefore, in showing that Dr. Kulka's paper, in

the final analysis, is no great advertisement of Ascher's Enamel, nor any serious attack on the others named.

Analysis of Dr. Kulka's Paper.

In the first place, it is yet an open question whether the death of a pulp under a cement filling is ever due to the filling itself, or to any acid reaction therefrom, provided the pulp be healthy and well protected by sound dentine at the time of filling. This was discussed in the editorial in our March issue. Suffice it at this time to quote from Dr. Kulka's own language. In his "Resumé of Table IX" (May ITEMS OF INTEREST, p. 370) he says:

"If, therefore, phosphoric acid itself is in the slightest degree dangerous and can really penetrate to the pulp, then," etc., etc.

Then follows the deduction that Ascher's cement is the least harmful, Harvard about the same, and the others to be considered with suspicion, especially Phenakit.

Note that the entire force of this deduction depends upon the premise, first, that phosphoric acid escaping from the cement may penetrate to the pulp, and secondly, that having done so it may prove destructive of that organ. That this latter postulate is true is not proven by Dr. Kulka, nor has it been proven, to our knowledge, by anyone else. There can be little doubt, however, that phosphoric acid would prove a dangerous irritant, provided it could reach the pulp in sufficient quantity, and of sufficient potency.

The whole problem of the danger from this source, in using silicate cements, must hinge therefore upon an investigation of the quantity and potency of any irritant acid that might reach a pulp through the use of a cement.

According to Dr. Kulka's experiments Harvard cement makes practically as good a showing as Ascher's. In one place (ibid. P. 372) he tells us that "If a cement is prepared for a filling in too dilute a manner, then surely, because of the slow binding of the acid, sufficient remains free long enough to affect the dentine, percolate through the tubules, and affect the pulp."

In his experiments, Dr. Kulka mixed Harvard in the relation of 40 parts of liquid to 100 of the powder, the mass presumably being of the consistency used for a filling. But Harvard cement is very widely

used in this country for the cementation of inlays, and as a cementing medium is necessarily mixed much thinner, that is to say in the "dilute" manner which Dr. Kulka tells us would enable the phosphoric acid to penetrate the dentine and affect the pulp. Yet we have heard no complaint in this country of death of pulps under inlays set with Harvard cement. Lest it be argued that but a small stratum of cement is used under inlays, it should be pointed out that most large gold inlays in this country are made hollow and permit considerable quantities of the cement to lie between the inlay and the pulpal wall.

Again, the value of Dr. Kulka's conclusions must, of course, depend upon the accuracy with which he has been able to reproduce in the laboratory those conditions present in the mouth. While the writer is not an analytical chemist, he must agree with Dr. Schreiber's protest against the methods used in compiling Tables V, VI, VII, VIII, and IX, which are the basis of the statement that free acids are liberated by the cements. In these experiments, after stated periods (from 40 minutes to 48 hours), the mixed cements are powdered, mixed with distilled water, filtered, and the filtrate titrated.

Nothing like this can occur in the cavity. The filling, of course, remains intact, and whatever might be accomplished chemically with a filling powdered and placed in distilled water does not logically prove that the same results would maintain with a filling allowed to remain in a solid mass, either immersed in distilled water in the laboratory, or more particularly, left in place in the mouth, where whatever fluid might reach it must do so by percolating through the enamel and dentine of the tooth.

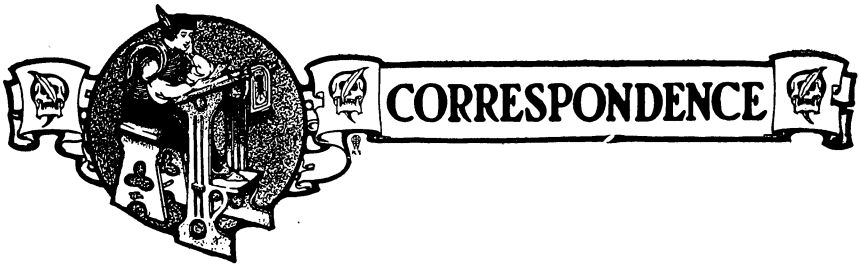
Kulka's Experiments in Ivory.

Much more interesting are Dr. Kulka's experiments with ivory. If we understand him correctly here, he tested the mixed cements, not powdered. He prepared two sheets of ivory, each 2 mm. thick, by drilling a central hole through them. Between these he placed a third layer of ivory 3 mm. in thickness, and these were then securely bound together. This gave him practically two cavities, separated by three millimeters of ivory. In the upper cavity he placed the cement to be tested, and in the lower a wick of blue litmus. The whole was immersed in a water chamber to a marked point and placed in a thermostadt for twenty-four hours. Ascher's and Harvard cements

caused but slight reddening of the upper surface of the intervening plate, while the others caused a reddening to a depth of from 0.01 mm. to 0.03 mm.

Thus Dr. Kulka shows us that all the cements tested by him are safe, if his experiments are correct, because the worst showing was a penetration to the extent of three-tenths of a millimeter in twenty-four hours, and any pulp protected only by so slight a covering of dentine is already in a pathological condition due to the too near approach of caries, and such pulps should be removed prior to the insertion of any filling, while the death of such pulps after filling becomes a reflection on the judgment of the operator, rather than any argument against the material used. It should further be noted that ivory being quite porous, the water from the water chamber may penetrate and reach the cement, thus extracting its free acid much more readily than could the fluids of the mouth reach the pulpal surface of the cement filling, in a tooth protected by dentine and enamel. Indeed, as the entire outer surface of the silicate cement filling is bathed in the fluids of the mouth, why would not the free acid, if any exist, travel in quite the opposite direction, *i. e.*, away from the pulp?

In conclusion, the great probability is that all the silicate cements are sufficiently safe if used in appropriate places. The question that remains is, are they durable? We would be glad to see the cement experts in Germany and elsewhere drop the question of danger to pulps and apply their scientific minds to the problem of producing a silicate cement which will withstand the fluids of the mouth and the stress of mastication.



Dental Educational Council of America.

Editor ITEMS OF INTEREST:

DEAR DOCTOR.—A joint meeting of the Executive Committee and the Committee on Colleges of this Council was held in Chicago on Sunday, April 9. One of the subjects up for discussion was how to best stimulate a sympathetic interest in the profession in behalf of the work which this body is now endeavoring to do.

From the outset, it was realized that the aims and object of this organization are not very well understood by the profession, and the Secretary was instructed to write to the editor of each dental journal and respectfully invite his co-operation.

Enclosed we hand you a copy of our articles of organization, which will give you information along general lines. Doubtless you are aware that there has been a great deal of general criticism of American dental colleges. Justice compels us to say that after two years of work along these lines, we are free to confess that there is some justification for some of the complaints which have been made. By reading the circular you will note that this Council is composed of five representatives from each one of the three national bodies, and we feel that therefore it should be regarded as representative. Our function is purely advisory, and we are trying, in a systematic way, to find out what the real trouble is that is being complained of, by making a thorough investigation of the kind of dental education now being offered, and we hope, in due time, to make recommendations based upon our findings. A report for this year's work will be made at the next annual meeting of the three national bodies, and we hope that our organization will be continued for at least another year.

The question of how reforms in dental education can be enforced very naturally arises. What is the good of an inquiry if suggestions making for reforms, made by a fair-minded commission, cannot be enforced?

We are frank to admit that an inquiry, no matter how searching, which may be conducted by this or some other commission, will not

necessarily provide men with consciences. In other words, it is not an easy matter to make men honest unless they want to be. There are ways and means, however, which we believe can be adopted with good results. The one legal body that we know of that can enforce the law is the State Board of Dental Examiners, and at the proper time, should occasion demand this, we believe that action can be procured.

There is, however, another side to this question. Many of the differences that have arisen between the colleges, State boards and the profession at large, are due to prejudices which find their origin in a lack of mutual confidence and respect. That there are dental colleges which are not worthy of the name, every thoughtful and well-informed member of our profession will admit. On the other hand, there are many dental colleges that are doing good, honest work, and this fact must not be lost sight of.

During the past year we have heard some talk of the advisability of inviting the Carnegie Foundation to investigate our dental schools. We have no fault to find with this, and would cheerfully co-operate with any properly constituted commission, in an endeavor to raise our standards of dental education. Some time has now elapsed since this Commission or Foundation has made its report on medical education. Just how much good this report has done, we do not know. The question to which we would like to invite your thoughtful consideration is, "Are fair-minded men representing our three great national bodies who are familiar with the needs of dental education, and who are making a study of its problems, entitled to the co-operation and assistance of the profession at large?" If the State boards, dental colleges and their faculties, and our State dental societies will get behind this movement, and the information of how this can be done is given them through the medium of our dental journals, it is easy to prophesy that the results obtained will make for the general uplift of dentistry. The best results, however, can not be obtained in one or two years, and we believe that it is only by patient, persistent and honest effort that permanent improvements can be hoped for.

I shall be glad to hear from you, and can promise in advance that I will frankly, fairly, and to the best of my ability answer any questions you may care to ask respecting the work of this Council and its organization.

With sentiments of esteem and kind personal regards, I am,

Sincerely yours,

HENRY L. BANZHAF, Secretary.

Appointments in the Army.

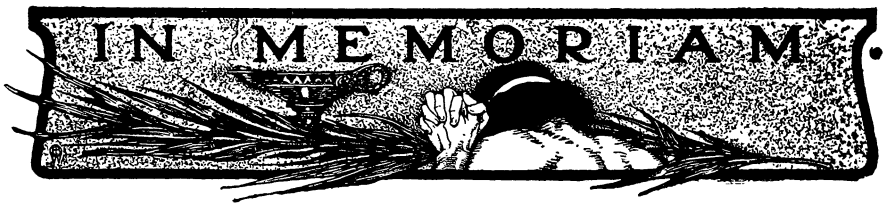
Executive Nominations of May 18th, 1911.

Contract Dental Surgeons herein named for appointment as dental surgeons, with rank of first lieutenant, each to rank from the date set opposite his name:

John Sayre Marshall	April	13,	1911
Robert Todd Oliver	"	14,	"
Seibert Davis Beak	"	15,	"
Clarence Edward Lauderdale	"	16,	"
Franklyn Fearing Wing	"	17,	"
George Lemuel Mason	"	18,	"
Frank Homer Wolven	"	19,	"
John Henry Hess	"	20,	"
Hugh Gordon Voorhies	"	21,	"
William Henry Chambers	"	22,	"
Alden Carpenter	"	23,	"
Charles James Long	"	24,	"
Edwin Payne Tignor	"	25,	"
John Archibald McAlister	"	26,	"
George Henry Casaday	"	27,	"
Julian Rex Bernheim	"	28,	"
Rex Hays Rhoades	"	29,	"
George Edward Stallman	"	30,	"
George Irving Gunckel	May	1,	"
Frank Powell Stone	"	2,	"
Raymond Eugene Ingalls	"	3,	"
Harold O. Scott	"	4,	"
John Richard Ames	"	5,	"
Edward Pressley Rhea Ryan	"	6,	"
Robert Hillard Mills	"	7,	"
Frank Leonard Kemner Laflamme	"	8,	"
Minot Everson Scott	"	9,	"
George Dudley Graham	"	10,	"
Robert Fulton Patterson	"	11,	"
Samuel Hunter Leslie	"	12,	"

The above list is the complete Commissioned Dental Corps as sent to the Senate by the President for confirmation.

EMORY O. BRYANT.



Dr. Roderick M. Sanger.

Dr. R. M. Sanger, neighbor, friend and fellow-practitioner, died on Easter Sunday morning. He was stricken while dressing and died in a few minutes, then, as was his belief, translated to be with the Saviour he loved and worshipped.

Dr. Sanger was born in 1856, thus was fifty-five years of age—just in his prime; but he had fulfilled the work of a man. He had been a member of the New Jersey State Dental Society and also of the C. D. A., and had been the president and faithful member of both of these societies. He was a member of several of the New York societies and of the National Faculties Association. He was Professor of Mechanical Dentistry in the New York College of Dentistry. He was a member of the Masonic fraternity and a Knight Templar. In all these societies he fulfilled every obligation of membership. He always took a deep interest in all that pertained to the welfare and advancement of the honor of the profession he so deeply loved.

Dr. Sanger belonged to the Legion of Honor, the legion of true and honest dentists. He labored without ceasing that dentistry might be exalted. Like all true men, he loved his fellow-practitioners, and this made him a lover of our associations.

Dr. Sanger was peculiarly gifted as a speaker, and at our banquets and other gatherings was specially happy in expression and grace of delivery, so much so that he was frequently referred to as the "silver-tongued" orator. In this we shall greatly miss him. Dr. Sanger was of a very kindly and generous disposition, strong, affectionate and endearing in his friendships, always willing and glad to help any who needed his help.

He had well developed the blossom of friendship, the sweetest flower in the conservatory of the soul.

Dr. Sanger not only loved his profession, but he manifested a deep interest in affairs. He served his city of East Orange as Alderman and as a member of its Board of Education. He was chairman of the Committee on Buildings, and some of the city's most beautiful school buildings were erected under his supervision and are thus his monuments.

He always stood for the right, regardless of party, and thus left a name honored by all who knew him.

"A king can make a belted knight,
A marquis, duke and a' that;
An honest man's above his might,
He's king of men for a' that."

Good friend, hail and farewell.

CHARLES S. STOCKTON.

Newark, N. J., May 1, 1911.

Dr. Hugh M. Reid.

It has not been the privilege of many students to continue in active practice where they could watch the progress and assist in the development of modern dentistry as did Dr. Reid, who for more than a half-century made it his life work to practice and to teach dentistry.

He was born in 1836, and studied at Ohio Dental College. In 1857, when only twenty-one years of age, he began practice in Green Castle, Indiana. Later he practiced for ten years in Cedarville, Ohio. In 1870 he moved to Cincinnati, where he practiced for eleven years, during which time he taught five years in the Ohio Dental College. In 1881 he came to Minneapolis, where he practiced until 1896, at which time he began teaching in the Dental Department of the University of Minnesota, devoting his whole time until June, 1908, when he retired to spend the remainder of his life on his farm at Eatontown, New Jersey, where he died March 3, 1911, in his seventy-fifth year.

Dr. Reid was a man of large physique, full of energy, and crowned with a countenance beaming with kindness and good will which always brought noble inspirations to those with whom he came in contact. He will long be remembered by those who were students during the fourteen years of his teaching, and who were accustomed to call him "Daddy." His kindly and helpful interest in all the boys, his ability as an instructor and a strong personality endeared him to the students, and as they visited the college in after years it was always in "Daddy's" office they sought to renew their college days.

Dr. Reid helped to organize the Minnesota State Dental Association, and was a charter member and treasurer until he removed to New Jersey in 1908, there to retire after fifty-one years of continuous work in dentistry.

He is survived by four children and a goodly group of grand and great-grandchildren.

Committee:

OSCAR A. WEISS, D.D.S., Chairman.
WM. F. LASBY, B.A., D.D.S.
NORMAN J. COX, B.A., D.D.S.

University of Minnesota,
College of Dentistry.



SOCIETY ANNOUNCEMENTS

National Society Meetings.

NATIONAL DENTAL ASSOCIATION, Cleveland, Ohio, July 25th to 28th, 1911. Secretary, Dr. H. C. Brown, 185 E. State St., Columbus, O.

AMERICAN SOCIETY OF ORTHODONTISTS, September 20, 21, 22, 23, 1911, Boston, Mass. Secretary, Dr. F. C. Kemple, 576 Fifth Avenue, New York.

State Society Meetings.

DELAWARE STATE DENTAL SOCIETY.
Secretary, Dr. Warren Combs, 410 Delaware Ave., Wilmington, Del.

MARYLAND STATE DENTAL ASSOCIATION.
Secretary, Dr. F. F. Drew, 701 N. Howard St., Baltimore, Md.

MICHIGAN STATE DENTAL SOCIETY.
Secretary, Dr. Marcus L. Ward, Detroit, Mich.

NEW MEXICO DENTAL SOCIETY.
Secretary, Dr. L. E. Erwin, Carlsbad, New Mexico.

NEW JERSEY STATE DENTAL SOCIETY, Asbury Park, N. J., July 19, 20, 21, 1911.
Secretary, Dr. Chas. A. Meeker, 29 Fulton St., Newark, N. J.

OHIO STATE DENTAL SOCIETY.
Secretary, Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.

RHODE ISLAND DENTAL SOCIETY.
Secretary, Dr. C. A. Carr, 209 Spring St., Newport, R. I.

SOUTH CAROLINA DENTAL ASSOCIATION, Columbia, S. C.
Secretary, Dr. W. B. Simmons, Piedmont, S. C.

WEST VIRGINIA STATE DENTAL SOCIETY.
Secretary, Dr. F. L. Wright, Wheeling, W. Va.

WISCONSIN STATE DENTAL SOCIETY, Eau Claire, Wis., July 11, 12, 13, 1911.
Secretary, Dr. O. G. Krause, Wells Bldg., Milwaukee, Wis.

National Dental Association.

Programme.

Addresses of welcome by public officials and representatives of the Dental Societies and Local Committee. Response, Burton Lee Thorpe, St. Louis, Mo. President's address, Edward S. Gaylord, New Haven, Conn. "Evolution in Dentistry," S. G. Perry, New York City. At the General Session, Wednesday, R. H. Hofheinz, Rochester, N. Y., will be the essayist; subject not received in time for this notice.

Section 1.

"Some Factors in the Growth of Modern Orthodontia," Frederick B. Noyes, Chicago, Ill.

"Physics and Dynamics Involved in Dental Casting," J. G. Lane, Philadelphia, Pa.

"The Question of Extraction in Orthodontia," C. S. Case, Chicago, Ill.

"Adapting Full Dentures," E. M. Kettig, Louisville, Ky.

"Crown and Bridge Work," Wm. O. Hulick, Cincinnati, Ohio.

"Dental Impactions and Preventive Treatment," Varney E. Barnes, Cleveland, Ohio.

Section 2.

"Mistakes, Common and Uncommon," C. N. Johnson, Chicago, Ill.

A review of paper by P. B. McCollough, "Wherein Clinical Evidence is at Variance with Extension for Prevention," W. R. Clack, Mason City, Iowa.

"What's in a Name?" Frank W. Low, Buffalo, N. Y.

"Dental Societies and Their Purposes," Charles S. Butler, Buffalo, N. Y.

"The Necessity for Dental Education on the Subject of Mouth Antiseptics," Joseph Head, Philadelphia, Pa.

Section 3.

"Secondary Concretions of the Dental Pulp," W. R. Bunting, Ann Arbor, Mich.

(a) "A Group of Deformities of the Nasal Respiratory Tract, Coincident with Dental Irregularities." (b) "A New Instrument for Comparative Measurements, Demonstrating Changes in Nasal Fossa When Readjusting the Maxillary Arch," George H. Wright, Boston, Mass.

"The Necessity for and Training of Prophylaxis Assistants," Alfred C. Fones, Bridgeport, Conn.

"Action on Tooth Structure of Various Colored Medicaments," W. H. O. McGehee, Cincinnati, Ohio.

(a) "Amalgam Experiments, Covering Their Manufactory Manipulalations and Physical Properties. (b) Cements: Their Manipulation and Tests of Physical Properties" (Illustrated), C. M. McCauley, Abilene, Texas.

Wednesday evening will be devoted to a public Oral Hygiene meeting. "Oral Hygiene from an Educative Standpoint," Miss C. L. O'Neill, Cleveland, Ohio. "The Progress of the Work for the Past Year," J. P. Corley, Sewanee, Tenn. Another essayist will be selected later.

The Clinical Programme is not complete at this date, June 8th; however, 277 Clinicians have been secured, and are classified as follows: American Circulating Dental Clinic, 40; Concerted Gold Filling, 10; Surgical, 10; Porcelain, 26; Gold Fillings and Inlays, 25; Orthodontia, 13; Pyorrhea and Oral Prophylaxis, 21; Crown and Bridge Work, 45; Miscellaneous, 87.

Membership in your State Dental Society, or allied societies, makes you eligible to the National; membership fee $5, which pays annual dues for one year and entitles you to copy of Transactions. Application blanks may be secured from the secretaries of the State societies, or from Charles W. Rodgers, Corresponding Secretary, 165 Harvard Street, Dor., Boston, Mass.

The foregoing should prompt you to arrange to attend this meeting, which will be held in Cleveland, Ohio, July 25th to 28th, and become actively associated with our National organization.

Fraternally yours,

EDWARD S. GAYLORD, President,
63 Trumbull St., New Haven, Conn.
HOMER C. BROWN, Recording Secretary,
185 East State St., Columbus, Ohio.

Special Trains from New York.

Delta Sigma Delta Special Train.

The annual meeting of the Delta Sigma Delta will be held in Cleveland, Ohio, Monday, July 24th, being one day prior to the opening meeting of the National Dental Association. The banquet will occur on Monday evening.

The New York Auxiliary has completed arrangements with the New York Central Lines for a special train to leave the Grand Central Terminal at 5:30 p. m., Sunday, July 23d, arriving in Cleveland at 7:15 a. m. Monday, July 24th. The special train will be electric lighted throughout, and will consist of high-grade Pullman sleeping cars and compartment observation car, and will be run as a second section of the celebrated Lake Shore Limited. Brothers in Boston and vicinity may connect with this train by leaving Boston at 2 p. m., arriving at Albany at 7:45 p. m., the Lake Shore Limited being due to leave Albany at 9 p. m.

It is suggested that the New England delegation travel in parlor cars as far as Albany, at which point they may change to the special train, upon which sleeping accommodations may be reserved by communicating with Dr. Ottolengui.

The cost of railroad transportation on the special train from New York to Cleveland will be $19.50, which rate has been authorized on the certificate plan. This provides for the purchase of one way ticket, New York to Cleveland, for $13, securing from the selling agent at the time of purchase a certificate which, *when validated* by the special representative of the Central Passenger Association in Cleveland, will entitle the holder thereof to one-half rate returning ($6.50). This rate is authorized, however, on condition that one thousand or more persons will be in attendance at the meeting.

Pullman sleeping car charges will be $3.00 for lower berth, $2.40 for upper, $5.40 for section, $8.50 for compartment and $11 for drawing-room.

The cost of railroad transportation from Boston to Cleveland, on the basis of ten or more traveling together, will be $12.90 per capita. Sleeping car charges will be $3.50 for lower berth, $2.80 for upper, $6.30 for section, $10 for compartment and $13 for drawingroom.

National Dental Association Special Train.

Members of the National Dental Association who may desire to reach Cleveland as early as Monday will be made welcome on the Delta Sigma Delta Special, even though not members of the fraternity. While negotiating for this train the undersigned thought it well also to provide for a Special for the National Association meeting proper.

The National Association Special will leave Grand Central Terminal, New York City, at 8 p. m. Monday, July 24th, arriving at Cleveland at 10:45 a. m. Tuesday, July 25th. The special train will be electric lighted throughout and will consist of high-grade Pullman sleeping cars

and compartment observation car, and will be run as a second section of the Buffalo and Cleveland Special. Members in Boston and vicinity may connect with this train by leaving Boston at 4.50 p. m., arriving at Albany at 10:40 p. m., and leaving Albany at 11:40 p. m.

Applications for Pullman reservations should be addressed to Mr. E. J. O'Hayer, Jr., General Eastern Passenger Agent, New York Central Lines, 1216 Broadway, New York, N. Y.

Pennsylvania R. R. Trains.

The Pennsylvania Railroad will operate special cars or special train from the Pennsylvania Station, 32d Street and Seventh Avenue, to Cleveland, Ohio, in the event a sufficient number signify their desire to leave at one time, for delegates from New York, New Jersey, Pennsylvania, Maryland and District of Columbia. Electric lighted, all-steel drawingroom sleeping cars operated on all trains. Daily service as follows:

Lv. New York	Philadelphia	Baltimore	Washington	Ar. Cleveland
8.04 a. m.	*10.25 a. m.	10.20 a. m.	9.10 a. m.	10.30 p. m.
5.04 p. m.	† 7.02 p. m.	7.52 p. m.	6.45 p. m.	7.30 a. m.
6.32 p. m.	† 8.17 p. m.	7.52 p. m.	6.45 p. m.	7.30 a. m.
8.30 p. m.	*10.48 p. m.	8.55 p. m.	7.55 p. m.	11.30 a. m.

For Pullman reservations and full information communicate with Mr. C. Studds, District Passenger Agent, Pennsylvania Railroad, No. 263 Fifth Avenue, New York City. R. OTTOLENGUI.

*Lv. Broad Street, Philadelphia.
†Lv. North Philadelphia.

Illinois State Dental Society.

The Illinois State Dental Society held its forty-seventh Annual Meeting at Peoria, May 9-12, 1911.

The following officers were elected for the ensuing year: President, C. C. Corbett, Edwardsville; vice-president, J. P. Luthringer, Peoria; secretary, J. F. F. Waltz, Decatur; treasurer, T. P. Donelan, Springfield; librarian, A. Don Stocker, Alton.

The 1912 meeting will be held at Springfield, May 14, 15, 16, 17, 1912. J. F. F. WALTZ, Secretary.

Decatur, Ill.

Wisconsin State Dental Society.

The forty-first annual meeting of the Wisconsin State Dental Society will be held at Eau Claire, Wis., July 11, 12, 13, 1911. All ethical members of the profession are cordially invited.

O. G. KRAUSE, Secretary.

Wells Bldg., Milwaukee, Wis.

W. V. Miller Club of Berlin.

At the sixth annual meeting of the W. V. Miller Club, of Berlin, Germany, the following officers were elected for the ensuing year:

President, Lee H. Watling; Vice-President, E. Lawley York; Secretary-Treasurer, A. J. Culver.

Contributions of Books Requested for German Library.

A committee for the erection of the German "Zahnaerzte-Haus" has been organized in Berlin. The "Zahnaerzte-Haus," an institution founded for the benefit of the dental profession of Germany, will contain laboratories for scientific research, a complete dental library, as well as a dental museum, rooms for giving post-graduate courses, and a very complete exhibit of models showing various methods in operative and mechanical dentistry; a collection which was started some time ago by the State. Besides this, there will be two infirmaries, one for school children and the other for the poor. Large halls for dental conventions and the meetings of the local societies will be provided for in the building. A bureau will also be incorporated, whose duty it will be to collect all statistics bearing upon dentistry, to do the secretarial work of the national dental organizations and benevolent societies, as well as to act as a bureau of general information.

It is the earnest wish of the committee to be able to place a library, as complete as possible, at the disposal of the dental profession when the institution is opened. As the collection of such a library takes some time, the committee has decided to begin at once, and therefore requests all colleagues, who have distinguished themselves by scientific work, to aid in completing this library by donating copies of their works, or reprints. The donors may be assured of the thanks, not only of the committee, but also of all those who have at heart the advancement of dental science. Duplicates, or books to which the owner attaches no special value, would also be gratefully received.

Please address all packages to Zahnarzt Pursche, Rankestrasse 30, Berlin, Germany.

The Committee for the Erection of the German "Zahnaerzte-Haus":

A. GUTTMANN, Chairman.
ROB. RICHTER, D.D.S.,
PURSCHE,
MAMLOK,
HELM,
H. W. C. BOEDECKER, M.D., D.D.S.

Bridgeport Dental Society.

The following officers for the Bridgeport Dental Society were elected to serve for the year 1911: President, T. A. Ganung; vice-president, R. H. W. Strang; secretary, J. J. Myers; treasurer, C. F. Gibbs; executive committee, J. L. Egan, chairman; L. E. Sage, J. H. Callahan.

Eastern Dental Society.

The Eastern Dental Society of the City of New York held its regular monthly meeting at the Café Boulevard on May 4th, 1911, with a large attendance of members and guests.

Dr. S. W. A. Franken read a paper on "Cavity Preparation for Gold Inlays," and Dr. Leon J. Solow demonstrated "The Uses of Silicate Cements."

A. Le Witter, Secretary.